

Factors Affecting the Formation of Interest Groups

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Abstract

This paper presents empirical information to assist in answering the question: Why does the number of interest groups vary from one political jurisdiction to another? This paper's contribution to the understanding of the political economy of collective behavior is an empirical, cross-sectional study of interest group formation in the United States. The unit of observation is the county circa 2000. On a per capita basis, this study finds that lower voter participation rates, higher government expenditures, and higher religious adherence, on average, are consistent with the formation of more interest groups. On the other hand, having a religious market dominated by a small number of denominations is consistent with the formation of fewer interest groups. Likewise, being located in the Southern United States is consistent with the formation of fewer interest groups. According to these findings, firms seeking to avoid political opposition can increase their odds of avoiding opposition by locating in Southern, urban regions with concentrated religious markets.

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1 Introduction

1.1 Background

Interest group activity is often an important determinant of economic and political outcomes (Stigler, 1971). Interest groups affect economic outcomes through the acquisition of political influence. Individuals choose to initiate interest groups because, on a per member basis, collective action provides political influence at a lower opportunity cost than individual action (Crain, Tollison, and Deaton, 1991). Moreover, with the formation of new groups in any given geographic location, the level of interest group activity and the demand for political influence can both increase. Thus, within a geographic area, one convenient measure of interest group activity is the number of mobilized groups that have formed to pursue wide-ranging, common purposes. This study is a cross-sectional, empirical analysis of the number of mobilized interest groups in U. S. counties circa 2000. Knowledge of factors influencing interest group formation furthers our understanding of the ultimate determinants of political activity. Despite the usefulness of a theory to explain the number of interest groups in a polity, there is no recognized “Economic Theory of the Number of Interest Groups.” This research facilitates the formulation of such a theory.

Prominent economists have published theories that partially address questions about the number of interest groups. For instance, Stigler (1974) sets forth and provides empirical support for a theory that purports to explain why there can be large numbers of interest groups operating despite the problems associated with divergent policy preferences among members and the problems

associated with free riders.^{2 3} Stigler's formulation, however, does not predict the number of interest groups in a locality nor give any insight as to why more interest groups exist in some localities than others. Additionally, Crain, Tollison, and Deaton (1991) model the number of interest groups as a function of the price of political influence within state legislative bodies. They use legislative sizes and party majorities as measures of monopoly pricing power wielded by the legislature. This model, though readily generalizable in many aspects, is specific to subsets of interest groups in pursuit of a common benefit; its logic is applicable only when groups share a single common purpose.

Political jurisdictions, however, have many different types of groups, with many unrelated interests, seeking a variety of different types of benefits. Nonetheless, all of these varied groups have something in common. Each and every interest group is in the market to cost-effectively influence the policy or politics of some governing body.⁴ The governing body could be the U. S. Congress, a local school board, the board of directors of a corporation, or any number of other decision-making bodies. Likewise, each organization seeks to use whatever influence it acquires to gain a public or a private collective wealth or rights transfer. Hence, by extension, when we ask why one jurisdiction has more interest groups than another, we are trying to identify those local characteristics consistent with a low opportunity cost of political influence, and perhaps those characteristics consistent with higher returns to investment in

² The term "purports to" is used here because there are competing theories such as Olson's (1965) by-product theory.

³ The free rider proposition asserts that individuals will frequently fail to join or assist in collective actions destined to be of benefit to them in the absence of coercion or inducements.

⁴ Crain, Tollison, and Deaton (1991)

influence. These characteristics are effectively the determinants of interest group formation.

The interest group literature identifies many potential determinants of interest group formation. The theories outlined in section 3.3 of this paper dictate which potential determinants are tested.⁵ Section 3.3 also details the hypotheses tested respective to each theory.

Under the prescribed empirical methodology, 14 variables emerge as statistically significant determinants.⁶ This introduction highlights only a few of the determinants uncovered. These highlighted determinants are considered the most noteworthy. Table 1. lists the estimated elasticities for these determinants and all other determinants having a marginal significance level of 0.05 or less. Each marginal significance level is relevant to each determinant's marginal effect derived while controlling for all other independent variables. For indicator variables, the regression coefficients divided by the mean predicted value of the number of interest groups per capita is displayed in place of the elasticity.

1.2 Discussion of Highlighted Findings

Under the specifics of this analysis, a one percent increase in county government expenditure per capita increases the predicted number of groups per capita by 0.09 percent (marginal significance level=0.00).⁷ This result seems to imply that more publicly provided resources, such as infrastructure and libraries, reduce the cost of, and perhaps increase the potential benefit of,

⁵ See Section 3 for more details on the independent variables--potential determinants--tested.

⁶ Section 4 covers the empirical methodology.

⁷ See Section 4 for empirical methods employed.

acquiring influence. Where there is more government spending, perhaps there is more wealth available to redistribute. As such, more groups arise to compete for control of discretionary funds. In following this line of reasoning, caution is required however. Government spending levels are reported in nominal terms. Due to the lack of suitable indices, I cannot control for interarea cost-of-living differences with precision in this project.⁸ To control for interarea cost-of-living differences to some degree, inflationary indices proxy for interarea indices. Nominal dollar values are adjusted by the regional, seasonally-unadjusted, annual, urban consumer price index for 2000 as reported by the Bureau of Labor Statistics.

In contrast to government expenditure, on the per capita basis, a one percent increase in voter participation reduces the predicted number of interest groups by 0.26 percent (marginal significance level=0.04).⁹ This finding implies that low voter turnout shrinks the cost of influence relative to the potential returns to influence and thus encourages more group formation. Apathy on the part of the un-mobilized, latent group (citizens 18 years old and over) appears to encourage more special interests to mobilize.

Having a large number of religious denominations in an area, on the other hand, seems to discourage interest group formation. Likewise, dominance of the

⁸ Because this analysis is cross-sectional in nature, purchasing-power differences across polities arises as a central issue. Governments in relatively high-cost areas may deliver fewer goods and services in real terms than governments in lower-cost areas even though the high-cost-area governments spend more in nominal terms. Interarea cost-of-living indices account for these differences in purchasing power.

⁹ The voter participation rate elasticity is estimated at -0.24 with a marginal significance level of 0.06 in a robustness check using a fractional logit model specification. The findings of the primary regression and the fractional logit regression are very similar.

religious marketplace by a small number of denominations is correlated with fewer interest groups. The religious diversity measure and the religious concentration measure have marginal probabilities of 0.00 and 0.01 respectively.¹⁰ A one percent increase in the number of denominations decreases the predicted number of interest groups per capita by 0.16 percent.¹¹ A one percent increase in religious market concentration decreases the expected number of interest groups per capita by 0.21 percent. Conceivably, these decreases are due to substitution toward religious activity away from group formation. Rather than forming as independent units in the community at large, when a powerful, influential religious base exists, collectives may well find it more efficient to form as goal-specific auxiliaries within a church.

Additionally, it turns out that a one percent increase in the fraction of the population adhering to religion (any denomination) increases the expected number of interest groups per capita by 0.24 percent. Therefore, adherence is positively correlated with the number of interest groups per capita. Its marginal significance level is 0.01. The three findings for the religious measures, taken together, seem to indicate that jurisdictions having high numbers of adherents evenly dispersed among relatively few denominations will experience higher numbers of interest groups.

¹⁰ The Herfindahl index measures the denominational market concentration. The Herfindahl index is the sum of the squares of the market shares of all of the denominations in a county based on adherence figures.

¹¹ The religious diversity elasticity is estimated at -0.05 with a marginal significance level of 0.42 in a robustness check using a fractional logit model specification. The finding that the elasticity is negative is a robust finding for the most part. The 95% confidence interval of the fractional logit estimation includes a small positive range. The finding that the coefficient varies significantly from zero is not robust.

Table 1
Elasticity Estimates for the Number of Promotional Interest Groups per Capita

Independent Variable	Elasticity	t**	p**
Geo-political			
Number of Cities, Towns, Districts	0.06	3.98	0.00
Government Expenditure Per Capita	0.09	4.77	0.00
State Capital County (chg 0 to 1)	0.09*	2.02	0.05
Voter Participation	-0.26	-2.12	0.04
Charitable Nonprofits Per Capita	0.21	3.66	0.00
Southern Region USA (chg 0 to 1)	-0.26*	-3.63	0.00
Religious			
Percent of Pop. Adhering to Religion	0.24	2.92	0.01
Number of Denominations	-0.16	-2.93	0.01
Herfindahl Index	-0.21	-5.55	0.00
Demographic/Socioeconomic			
Population Density	-0.08	4.12‡	0.00
Percent of Pop. Above Poverty Level	1.17	3.09	0.00
Percent of Population Over 65	0.52	3.81	0.00
Farms (proxy for Farmers) Per Capita	0.13	4.40	0.00
Percent of Earnings from Farming	-0.03	-2.08	0.04

** Statistics for regression coefficients (marginal effects).

* Regression coefficient/Predicted mean value of number groups per capita.

‡ Inverse transformation; See Empirical Methods and Results, Part Two.

2 Literature Review

2.1 Interest Group Theory of Government

The political scientists Bentley (1908; 1967) and Truman (1951) speak to the significance of interest groups in shaping the American political landscape. Over the years, economists have enhanced, extended, and refined the observations of Bentley and Truman to formulate the present day Interest Group Theory of Government. The Interest Group Theory of Government asserts that political operatives are self-interested economic agents who respond to incentives in the same manner as other economic agents. As such, the behavior of these agents can be explained by applying the same economic principles that predict the behaviors of non-political operatives. Some of the seminal contributions to the evolution of the Interest Group Theory of Government are noted in this review. Contributions to the literature specifically addressing the question of why the number of interest groups varies from place-to-place follow.

Olson (1965) tackles the question of why individuals choose to participate in collective action. His work focuses largely on the individual economic agent's decision to join a group given the apparent lack of incentives at the margin when group size is large.¹² Olson's by-product theory of large pressure groups suggests large pressure groups are viable because they are formed for a purpose other than lobbying; for them, lobbying is a by-product of private goods

¹² Olson modeled the benefit of collective action as a private collective good with per member benefit declining as the number of members increased.

provision.¹³ Group insurance and professional journals are among the most commonly provided private goods. Their private goods are monopoly-priced. As such, despite growing incentive to free ride as group size expands, demand for their private goods induces membership. The monopoly rents they collect from selling the private goods are used to finance their lobbying efforts.¹⁴

Stigler (1971) examines government regulatory activity as a market phenomenon. The market demanders are special interests, industries, and firms seeking to benefit from regulatory changes. The suppliers are those who bear the costs of instituted regulations. Legislative bodies are brokers serving to facilitate the transfer of wealth from the suppliers to the demanders. Stigler (1971) bolsters his position that regulation results because it is demanded with empirical evidence from the petroleum industry, the trucking industry, and a host of occupations.

Building on Stigler's work, Peltzman (1976) provides a quantitative, general model of the legislative decision making process that is applied extensively in the regulation and public choice literature. In Peltzman's analysis, the legislator is a majority (vote) maximizer subject to a regulation-specific resource constraint: a limited amount of wealth to redistribute.

McCormick and Tollison (1981) characterize politicians as self-interested economic agents in the business of brokering wealth transfers. McCormick and Tollison (1981) explore numerous aspects of legislative decision-making, and

¹³ "Other" purposes include such things as providing professional journals, group insurance, volume-buying services, social outlets, and other private goods.

¹⁴ Stigler (1974) disagrees with Olson's logic. The "other purpose" offering is a private good that can be supplied by other entities, as such the power to charge monopoly prices does not exist in Stigler's view.

they provide a positive framework in which to assess political outcomes based on observable legislative measures such as the sizes of legislatures, legislative compensation, and the tenures of representatives. In other words, they shed light on the factors affecting the price of influence in an interest group economy by focusing on the brokers of transfers.

Becker (1983), on the other hand, explores the effects of competition among interest groups for influence. Becker (1983) contends that competition among interest groups is welfare enhancing in that it leads to a minimization of dead weight costs to society. In Becker's model, optimization occurs at the group's level as opposed to the regulator's level. Opposing groups individually maximize influence subject to constraints on spending dictated by potential gains and group size. As such, in equilibrium, the sizes of market distorting transfers are smaller than they would have been without interest group competition.¹⁵

2.2 Other Related Contributions

Murrell (1984) examines why interest group activity varies between jurisdictions. He studies "sectional" groups. The groups in his study represent for-profit industries. He uses international data from the Organization for Economic Cooperation and Development (OECD) to test 11 hypotheses concerning interest group formation. He finds the population, the degree of government decentralization, and the length of time that a democratic economic system has existed to be determinants of interest group formation.

¹⁵ Market distorting transfers are also known as taxes.

Gronbjerg and Paarlberg (2001) use Internal Revenue Service (IRS) data on advocacy nonprofits in Indiana counties to empirically examine variations in the density of nonprofit organizations. Advocacy nonprofits are interest groups mobilized to incite change.¹⁶ Gronbjerg and Paarlberg separate their independent variables into three categories: demand characteristics, supply characteristics, and structural characteristics.

Gronberg and Paarlberg (2001) use the number of religious denominations and the percentage of children in poverty as indicators of demand for nonprofits in a community. Their regression results indicate a significant, negative relationship between the indicators of demand and the densities of advocacy nonprofits.

Gronbjerg and Paarlberg (2001) use federal grants, library expenditure, church adherence, the percentage of college graduates in the population, and the percentage of residents between the ages of 45 and 54 as indicators of the supply of resources to support nonprofit activity. Library expenditure is used as a proxy for how willing residents are to tax themselves to support collective activities. Previous research by Guterbock & Fries (1997) indicates that college graduates and the middle-aged are those most actively engaged in civic life.¹⁷ At a significance level of 10 percent, Gronbjerg and Paarlberg (2001) find no relationship between advocacy group density and any of their indicators of the supply of resources.

¹⁶ Advocacy nonprofits are formed under Internal Revenue Code section 501 (c) (4), Civic Leagues and Social Welfare Organizations; they are commonly referred to as *promotional* interest groups. More information on advocacy groups is provided in section 3.1.

¹⁷ Guterbock & Fries (1997) employed national survey data. "Civic life" includes joining organizations, volunteering, and attending church.

Gronbjerg and Paarlberg (2001) use community size, employment structure, and population change to indicate community structure. Because of the highly skewed population distribution of Indiana counties, a dummy variable indicating that the largest city in a county has less than 10,000 residents is used as the community size measure. The percentage of the county's workforce that is employed within the county measures the employment structure. The rate of population change between 1980 and 1990 is the proxy for community stability. Advocacy group density is insignificantly correlated with population change and community size. There is a substantial, positive correlation between advocacy group density and local employment.

Together Murrell (1984) and Gronbjerg and Paarlberg (2001) provide all of the literary references framing the theories responsible for the choice of independent variables in this work. Like Gronbjerg and Paarlberg (2001), I use the number of advocacy groups per capita as the dependent variable in my key regressions, and I use the county as the unit of observation throughout. My sample includes data on Indiana and 46 other states however.¹⁸ Also, I use a more extensive set of independent variables than do Gronbjerg and Paarlberg or Murrell.

Oliver (2000) merged individual-level survey data obtained from the *American Citizen Participation Study, 1990* (Verba et al., 1995) with contextual demographic information from the 1990 U.S. Census Survey to provide a

¹⁸ Gronbjerg and Paarlberg's (2001) data is limited to Indiana counties; Murrell (1984) features international data on trade associations. All states are featured in the first part of the empirical work. Alaska, Rhode Island, and Connecticut are omitted in the second part. Connecticut and Rhode Island do not have county level governments. As such, these counties lack financial variables.

detailed analysis of the affect of city size on specific measures of civic participation such as voting. Oliver's research did not address group formation. Nonetheless, since interest group formation is the product of civic participation, his findings are relevant to this research. He found that the relationship between civic participation and city size is not monotonic. Participation in rural areas is relatively low. In metropolitan areas, participation is greatest in small cities (less than 5000 residents) and declines as city size moves away from the small-city peak. Given the totality of Oliver's findings, it is reasonable to consider that interest group formation as a function of population might be piece-wise linear or parabolic in nature. Oliver's findings inspired a piecewise-linearity test featured in the empirical section of this paper.

3 The Variables, Theories, And Testable Hypotheses

3.1 Dependent Variables

This study investigates the formation of civic leagues and social welfare organizations. The National Rifle Association, the American Association of Retired Persons, and the Waterville Women's Association are civic leagues and social welfare organizations. Formed under Internal Revenue Code section 501 (c) (4), civic leagues and social welfare organizations are commonly referred to as *advocacy* or *promotional* interest groups. These interest groups form to influence governments, businesses, and other organizations in society. This behavior makes them ideal for observation. These groups are distinct from charities. Under Internal Revenue Code (IRC) section 501 (c), charities are limited in the extent to which they can participate in legislative advocacy. Charities exceeding specific limits jeopardize their tax-exempt status. Civic leagues and social welfare organizations, on the other hand, face no legislative advocacy limitations.¹⁹ They do face limitations with regard to the endorsement of political candidates, however. In this regard, they are distinct from political campaign nonprofits (IRC section 527) as well.

There are two parts to the empirical analysis. In the first part, the number of promotional interest groups, n_4 , is the dependent variable. This part of the analysis tests one hypothesis: *An increase in population will, per se, increase the number of interest groups*. The second part of the analysis examines the other hypotheses listed in this section. The dependent variable is the promotional

¹⁹Additionally, for the most part, donations to promotional nonprofits are not tax deductible. Donations to charities are tax deductible.

interest group density. The density, $n4pc$, is the number of groups divided by the county population on April 1, 2000 as reported by the United States Census Bureau.

The interest group counts are from the IRS Business Master Files for tax year 2000. The details of how the initial the 848,590 records are culled, updated, sorted, and counted are in Appendix A of this paper.

The accuracy of any given count is affected by several factors. Errors owed to tax-filing rules and tax-filing practices are present for all counties across the board. For instance, organizations with incomes under \$5000 are not required to register as nonprofits. These organizations will never be counted; therefore there is no way of determining their numbers.²⁰ Also, the IRS Business Master Files contain some inactive organizations. Every three years the IRS tries to verify the existence of each organization. Their culling process is imperfect and is sometimes hampered when organizations change their addresses.

Additionally, some organizations choose to file group returns. A group return is a single tax return filed under a single Employer Identification Number (EIN) that reports the combined income for multiple affiliated organizations or chapters. Each chapter or affiliate has its own EIN but is not required to file a separate return if its income is reported on a group return. Group returns create a counting problem because a parent organization that resides in one county might have many affiliates or chapters in many different counties or in many

²⁰ The number of uncounted organizations is unimportant to this work because the measure is the counted groups (those required to file).

different states. Therefore, some group returns, though recorded appropriately in the database, cause an undercount of affiliated organizations.

Occasionally, group returns are entered into the Business Master Files according to the affiliates' EINs as opposed to the parent's EIN. When this error occurs, the parent's address information is married to each affiliate's EIN; the result is an extreme over count for the parent's county and an undercount for each of the affiliates' counties. When the number of organizations is regressed on population density, based on a comparison between internally-studentized residuals and externally-studentized residuals, there is only one influential outlier in the dataset.²¹ This type of data entry error causes this outlier.²² No more than 0.32 percent of the observations are likely to be affected by this type of error to any degree.²³

3.2 The Independent Variables

The independent variables are dictated by the hypotheses drawn from specific theories found in the literature. Table 2. is a list of the independent

²¹ The rule of thumb for influential outliers: observation is an influential outlier if the absolute value of the difference between the internally- and externally-studentized residuals is greater than one. A studentized residual is a residual divided by the estimate of its standard deviation. If the *i*th observation is omitted in estimating the standard deviation, the residual is *externally studentized*. If the all observations are included in the standard deviation calculation, the residual is *internally studentized*.

²² The outlying organization, which is headquartered in Des Moines, Iowa, has 5600 affiliated EIN records. In the dataset for this project, I correct the 5600 count to a count of one.

²³ Assertion based on detailed examination of records in 9 counties identified as outlying in the number of interest groups based on population. None of these observations were influential outliers. The rule of thumb for outliers: observation is an outlier if the absolute value of the internally-studentized residual is greater than 2.5 or the absolute value of the externally-studentized residual is greater than 3.5.

variables. Appendix B and Appendix C list the source and the summary statistics for each variable respectively.

The variables *psz03-psz10* are population size indicators. In the first part of the analysis, these indicators are cascaded to facilitate spline modeling.²⁴ Each takes on a value of one if the April 1, 2000 population falls within its specified population range or above its specified population range. For populations below its range, it is zero. In the second part of the analysis, the population size indicators are not cascaded. Each takes on a value of one if, and only if, the April 1, 2000 population falls within its specified population range.

The theories influencing the independent variable selections are concisely noted in the next section. The corresponding testable hypotheses are outlined as well.

²⁴ See Appendix E for information about spline models.

Table 2-Independent Variable Descriptions

Variable	Variable Description	Notes
<i>attyspc</i>	Attorneys Per Capita 2000	
<i>b2_pop01</i>	April 1, 2000 Population	
<i>chcountrcmSPC</i>	Religious Congregations Per Capita 2000	
<i>cntyage</i>	Age of County In 2000 [2000 - date_created]	
<i>crimert</i>	Crime Rate (FBI): 1999	
<i>decentral2</i>	Government Decentralization Measure 1997	1
<i>dentistspc</i>	Dentists Per Capita 2000	
<i>divd</i>	Diversity Measure 2000	2
<i>doctorspc</i>	Doctors Per Capita 2000	
<i>farm97pc</i>	Farms Per Capita 1997	
<i>herf</i>	Religious Market Herfindahl Index 2000	5
<i>icpi</i>	Interarea Consumer Price Index	
<i>wincomepc</i>	Personal Income, Per Capita, 1998: (Dollars)	6
<i>infantmor</i>	Infant Deaths Rate 1997e	
<i>lnb2pop01</i>	Log of Population April 1, 2000	
<i>m</i>	1 if in Midwest Region; 0 otherwise	
<i>majindustries</i>	Number of 2-Digit NAICS Industries 2000	
<i>n</i>	1 if in Northeast Region; 0 otherwise	
<i>n3orgswochpc</i>	Charities Per Capita 2000 (no churches)	
<i>numgovs</i>	Number of Cities, Towns, and Districts 1997	
<i>p45to64</i>	Percent of Population 45 To 64 Years, 2000	
<i>pabovepov</i>	Percent of Population Above Poverty Level 1997	
<i>pcastndr</i>	Percent Voting Third Party, 1996 Pres. Election	
<i>pclfp</i>	Civilian Labor Force Participation Rate 2000	3
<i>percentadh</i>	Percent of Population Adhering to Religion 2000	
<i>pfarmearn</i>	Farm Earnings, 1998: Percent of Total Earnings	
<i>pminority</i>	Percent Minority Population 2000	
<i>popdensity</i>	April 1, 2000 Population Density	
<i>pover65</i>	Percent of Population Over 65 2000	

Table 2-Independent Variable Descriptions (Continued)

Variable	Variable Description	Notes
<i>prodwpc</i>	Production Workers Per Capita 1997	
<i>pseduc</i>	Percent Bachelor Degree Or Higher, 1990	
<i>psz03</i>	Size Category 03: Population Less Than 50,000	
<i>psz04</i>	Size Category 04: Population 50,000 - 99,999	
<i>psz05</i>	Size Category 05: Population 100,000 - 249,999	
<i>psz06</i>	Size Category 06: Population 250,000 - 499,999	
<i>psz07</i>	Size Category 07: Population 500,000 - 749,999	
<i>psz08</i>	Size Category 08: Population 750,000 - 999,999	
<i>psz09</i>	Size Category 09: Population 1,000,000 - 1,499,999	
<i>psz10</i>	Size Category 10: Population > 1,500,000	
<i>punder18</i>	Percent of Population Under 18 (2000)	
<i>reldiv</i>	Number of Denominations	
<i>s</i>	1 if in South Region; 0 otherwise	
<i>state</i>	State Postal Code	
<i>state_capital</i>	1 if county hosts a state capital; 0 otherwise	
<i>wtotexp97pc</i>	Government Expenditure Per Capita 1997	6
<i>votepart</i>	Voter Participation 1996	4
<i>w</i>	1 if in West Region; 0 otherwise	
Note 1:	(Revenue from own sources)÷(state transfers); higher is more decentralized	
Note 2:	(Number of ethnic groups > 1% of population)÷8; eight is total number of groups	
Note 3:	(Number of people in the Civilian Labor Force)÷ (Number of people over 18)	
Note 4:	(Number of people who voted in 1996)÷ (Number of people over 20 (1996))	
Note 5:	The sum of the squares of the market shares of the religious denominations based on adherence.	
Note 6:	Quantity divided by urban regional cost-of-living indexes as proxy for interarea cost-of-living indexes.	

3.3 Theories and Hypotheses

Murrell (1984) sets forth a model of group behavior suggesting that the number of interest groups in a polity will increase as the population increases even if the population heterogeneity, the number of distinct regions, and the number of industries remains constant. In his model, assuming members' costs and benefits are a function of population, the interest group's objective is to select the optimal size of the group. Given that legislature size is linked to population size and given that legislature size rises disproportionately less than does population, the cost per group member of procuring a legislative majority rises more slowly than does the population. The upshot is that, under a given set of assumptions, the population elasticity of group size is less than one. Also, under a given set of assumptions, the population elasticity of the number of groups is one minus the population elasticity of group size. Therefore, the population elasticity of the number of groups must be positive. Hence, adapting Murrell's hypothesis for U.S. counties we have

Hypothesis 1. An increase in population will, per se, increase the number of interest groups in a county.

Independent Variable(s): The April 1, 2000 county population (*b2_pop01*)

Dahl and Tufte (1973) speculate that larger countries produce a wider range of goods and services than do smaller countries. Thus, larger countries have more industries. Having more industries means that there is a wider variety of competing interests. As such, the number of interest groups will rise as the number of industries rises. Hence,

Hypothesis 2a. The number of interest groups increases with the number of industries in a county.

Hypothesis 2b. The number of interest groups per capita increases with the number of industries in a county.

Independent Variable(s): The number of major industries in a county
(majindustries)

Eckstein (1963) contends that when governments undertake more functions, more interest groups will arise because there are more government policies available to be influenced. Application of this logic leads to

Hypothesis 3. The larger the role of government, the larger will be the number of interest groups per capita.

Independent Variable(s): The county government expenditure per capita
(wtotexp97pc)²⁵

When government is structured such that local governments perform more functions than do their respective central governments, there is a decentralization of political power. In the context of states and counties, county governments relying less on state intergovernmental revenue transfers are more decentralized in that they exercise more political power than do county governments relying more heavily on state transfers. Salisbury (1975) claims that more government decentralization leads to more interest groups. Hence,

Hypothesis 4. The more decentralized is government, the greater will be the number of interest groups per capita.

²⁵ The county government expenditure per capita is divided by the 2000 annual, seasonally-unadjusted, regional urban consumer price index (CPI) as reported by the Bureau of Labor Statistics. The CPI is a proxy for the interarea (geographic) consumer price index (ICPI). The ICPI is unavailable at the county and the regional level. Interarea cost-of-living indices account for differences in purchasing power from one locality to another. Government expenditure per capita is a proxy for government functions.

Independent Variable(s): Ratio of revenue from county to revenue from state (*decentral2*)²⁶

Given the uninterrupted right to organize freely, Olson (1982) says that interest groups perpetuate their existences. He claims that the total number of groups is directly related to the length of time that interest groups have had the right to form. In the U.S., there is no variation in the length of time that groups have had the right to form, but there is variation in the chartering dates of settlements and counties. Settlements are precursor to local interest group formation. Many settlements pre-date the counties in which they are situated. Though county chartering is not precursor to interest group formation per se, county chartering dates are used to distinguish areas with older settlements [thirteen original colonies] from those with newer settlements [Hawaii] in formulating

Hypothesis 5. The number of interest groups per capita in a county is positively related to the length of time that the county has been chartered.

Independent Variable(s): The county age (*cntyage*)

²⁶ The local government decentralization measure, *decentral2*, is constructed by dividing the revenue a county generates from its own resources by the revenue transfer it receives from its state government. The decentralization measure is a gauge of how political power, or fiscal-decision-making power, is divided between any state and any county. To explain its purpose further, assume there is an interest group called "ABC." Presumably, if more power rests "centrally" with the state, then interest group ABC needs only one chapter in that state to be effective. So, most counties in that state will be absent a chapter of ABC. If more power rests with the county, then ABC will need county-level chapters to be effective. More specifically, ABC will need chapters in counties where the county government is less subject to state fiscal control. A higher value of *decentral2* coincides with more decentralization. More decentralization is indicative of more local control.

The relationship between socioeconomic factors and the number of interest groups has been explored in a number of different ways. Salisbury (1975) asserts that as social differentiation increases during modernization, a greater variety of groups is created. Lincoln (1977) asserts that there is a well-documented tendency for organization membership to rise when the socioeconomic status of individuals rise. This information leads him to conclude that metropolitan areas with high status populations will contain more voluntary organizations than those metropolitan areas with lower status populations. Implicit in Lincoln's reasoning is that higher-status population provides higher numbers of nonprofit entrepreneurs. Corbin (1999) presents another view that focuses on the importance of financial resources to the formation of nonprofit groups. Income is a key determinant in his analysis. Though there seems to be variation in how different scientists view "socioeconomic development," theories consistently lead to

Hypothesis 6. The number of interest groups per capita increases with the level of socioeconomic development.

Independent Variable(s): High-status human capital measures

Percent of population with bachelor's degree (*pseduc*)

Dentist per capita (*dentistspc*)

Doctors per capita (*doctorspc*)

Attorneys per capita (*attyspc*)

Middle-to-lower class human capital measures

Farmers per capita, proxy-farms per capita (*farm97pc*)

Production workers per capita (*prodwpc*)

Other socioeconomic measures

Infant mortality rate (*infantmor*)

Income per capita (*wincomepc*)

Percent above the poverty level (*pabovepov*)

Percent earnings from farming (*pfarmearn*)

Macridis (1961) predicts that political ideologies and religious divisions destroy the unity of sectional groups. The result of this heterogeneity is the creation of several organizations within a single sector. Appropriate and testable generalizations of Macridis's theory are

Hypothesis 7a. The number of interest groups increases with the amount of diversity in a county.

Hypothesis 7b. The number of interest groups per capita increases with the amount of diversity in a county.

Independent Variable(s): Number of religious denominations (*reldiv*)
Ethnic diversity measure (*divd*)
Percent of population that is minority (*pminority*)

Dahl (1971) proposes that the number of interest groups in a country will rise as the opportunities for contestation [of the status quo] and the opportunities for effective civic participation rise. In the U.S., there is no discernable variation in these specific opportunities from county to county. There is some variation in the degree to which democratic rights are exercised from jurisdiction to jurisdiction, however. Since it is the exercise of democratic freedoms, as opposed to merely the existence of such freedoms, which leads to the open formation of interest groups, it is reasonable to pose and to test

Hypothesis 8. The number of interest groups per capita increases with the degree of voter participation and support for "third party" candidates.

Independent Variable(s): Voter participation (*vote*part)²⁷
Support for “third party” candidates (*pcastndr*)

Weisbrod (1988) argues that nonprofit organizations arise in response to market failures. Government efforts to correct market failures tend to target the demands of the majority. As such, they fail to address the specific needs of the least powerful segments of society. This market failure theory suggests that local, voluntary interest groups arise to address the failure of markets and governments to satisfy community needs. Hence, they form in response to unmet community needs. Thus, we have

Hypothesis 9. The number of interest groups per capita will be related to unmet community needs.

Independent Variable(s): Percent of population under 18 years of age (*punder18*)
Crime rate (*crimert*)
Percent of population above poverty (*pabovepov*)

Gronbjerg and Paarlberg (2001) present what is a “supply-side” theory. They suggest that nonprofits will be prevalent where resources needed for their survival are abundant. Their discussion is not cast in an economic framework. If it were, my interpretation is that they would say that an interest group *production and maintenance function* [italics mine] would have two primary inputs: human capital and financial capital. Important to human capital is high socioeconomic status, higher education, age, and religious affiliation. The important age

²⁷ The voter participation data is for the 1996 presidential election. The source provides the number of votes cast in each county. To estimate a voter participation rate, the number of votes cast is divided by the local population over the age of 20. The population over the age of 20 is a proxy for the number of registered voters in each jurisdiction.

segment is 45 to 54 year olds. Important to financial capital is high community wealth and the ample availability of government funding. “Important” means that the nonprofit sector will be larger if the factor is larger. There is no mention of the opportunity cost of inputs or comparative advantage. Though a more abundant supply could, *ceteris paribus*, imply lower costs. In any case, the socioeconomic issues are covered in a previously stated hypothesis, Hypothesis 6. The government spending issue is covered in Hypothesis 3. Also the religious affiliation issue is covered in Hypothesis 11. Consequently, to cover the leftover age-related issue, there is

Hypothesis 10. The number of interest groups per capita will be positively related to the fraction of the population between the ages of 45 and 54.

Independent Variable(s): Percent of population between ages 45 and 64 (*p45to64*)²⁸
Percent of population over age 65 (*pover65*)

There are several theories about the impact of community structure on the presence of voluntary groups. Lincoln (1977) theorizes that high levels of urbanization reduces community integration and thus leads to less support for voluntary groups. His theory suggests that smaller communities will have higher densities of nonprofits. Lincoln (1977) also suggests that voluntary organizations serve as resources for one another. For this reason, the odds of a

²⁸ Data for the 45-to-54-age bracket is not available cost-effectively for all counties. Thus, the age bracket 45-to-64 is used as a proxy.

group surviving increase as the density of existing organizations increases.²⁹ Wolch and Geiger (1983), on the other hand, suggest that the prevalence of nonprofit organizations will increase as manufacturing's share of the economic base increases and as the age of the community increases. Finally, Gronbjerg and Paarlberg (2001) observe that county seats, since they are hubs of social and public resources, tend to have higher densities of nonprofit organizations than do other communities. Likewise, by extension, counties hosting state capitals are likely to exhibit higher densities of nonprofit organizations than do other counties. Hence,

Hypothesis 11. The number of interest groups per capita will be related to community structure.

Hypothesis 12. The number of interest groups per capita will be greater in counties hosting state capitals than in non-hosting counties.

Independent Variable(s): See the table below for variables and predictions.³⁰

²⁹ Churches are IRC 501 (c) (3) organizations. Churches are one of the types of organizations believed to encourage formation, thus churches per capita and the other religious variables--other than the number of denominations (*reldiv*)--are included in the structural measures. The percent adherence is also relevant to the supply-side theory.

³⁰ Table 3 summarizes the predictions of the "structural" theories. The population size categories represent community sizes. The omitted size category is counties with populations under 50,000.

Table 3

Structural Measures

Description	Variable	Theory Predicts
County Age	<i>cntyage</i>	+
Charities Per Capita	<i>n3orgswochpc</i>	+
Churches Per Capita	<i>chcounttrcmshpc</i>	+
Labor Force Part. Rate	<i>pclfp</i> ³¹	+
Percent Adherents	<i>percentadh</i>	+
Population Density	<i>popdensity</i>	-
Prod. Workers Per Capita	<i>prodwpc</i>	+
Religious Herfindahl	<i>herf</i> ³²	- , +
State Capital County	<i>state_capital</i> *	+
Population 50K-99.9K	<i>psz04</i> *	-
Population 100K-249.9K	<i>psz05</i> *	-
Population 250K-499.9K	<i>psz06</i> *	-
Population 500K-749.9K	<i>psz07</i> *	-
Population 750K-999.9K	<i>psz08</i> *	-
Population 1000K-1499.9K	<i>psz09</i> *	-
Population > 1500K	<i>psz10</i> *	-
* Indicator variable		

³¹ The Census Bureau provided the civilian labor force participation for each county. It did not provide the participation rate. To estimate the civilian labor force participation rate, *pclfp*, the civilian labor force participation is divided by the county population over the age of 18. This estimation is not without error. In some areas, labor force participation can legally begin as early as age 12 or age 14. There is a wide variation in which age groups make up the potential labor pools. Hence the proxy can indicate participation in excess of 100 percent. Observations where *pclfp* indicates participation in excess of 100 percent are discarded. There are a very small number of these cases. Finally, there is the issue of statistical measurement error. The *pclfp* coefficient is likely to be biased downward.

³² The religious market Herfindahl index is the sum of the squares of the market shares of each denomination in a county according to religious adherence figures. The Herfindahl index quantifies the degree of religious market concentration. Where relatively few denominations control large market shares, the index will be relatively high. Where market share is more evenly divided among denominations, the index will be relatively low.

Dahl and Tufte (1973) claim that more distinct regions within a country implies more interest groups because different regions generally have separate governments. As such, each government becomes a separate focus of lobbying activity. Hence,

Hypothesis 13a. The number of interest groups will increase with the number of distinct regions.

Hypothesis 13b. The number of interest groups per capita will increase with the number of distinct regions.

Independent Variable(s): Cities, towns, special districts, and school districts
(*numgovs*)

4 Empirical Methods And Results

4.1 Part One: The Number of Interest Groups

In this section, the dependent variable is the number of promotional interest groups ($n4$). This part of the analysis tests a hypothesis proposed by Murrell (1984): *An increase in population will, per se, increase the number of interest groups*. Murrell's (1984) model suggests that the number of interest groups in a polity will increase as the population increases even if the population heterogeneity, the number of distinct regions, and the number of industries remains constant. To see if the number of interest groups increases as the population increases under the conditions outlined by Murrell, the natural log of the number of interest groups is regressed on three of the four regional indicator variables and the natural logs of the population, the number of major industries, the ethnic diversity measure, and the religious diversity measures.³³ The population elasticity of the number of interest groups is 0.56. The t-statistic calculated using a robust standard error estimator with clustering by state is 16.98. The marginal significance level is zero. This simple model explains 85 percent of the variation in the number of interest groups. Other than some heteroscedasticity, analysis of the residuals reveals nothing problematic, and there are no influential outliers based on the Cook's distance criteria.

To check for robustness, a Poisson model with a log-log specification for the expected value of y_i given x_i (λ) is used. The elasticity estimates are of

³³ Religious diversity measures: Number of denominations and the Herfindahl index (*reldiv* and *herf*). The regional indicator variables are included to account for regional effects that may be present.

the same sign and order of magnitude for all regressors having marginal significance levels below 0.10. The 95% confidence intervals have regions of overlap for all regressors. Additionally, at the 10 percent significance level, the two model specifications agree on the significance of all regressors. The Poisson model's elasticity estimate is 0.62. See Appendix D for additional regression details for this section.

The log-log model tells us that over some range of values, the number of interest groups is positively correlated with population, but it does not rule out the possibility of a negative correlation within one or more population size categories. To check for monotonic progression through the size categories, a spline model that accommodates both jumps and rotations is usually useful.³⁴ For the present case however, severe multicollinearity makes a model encompassing both jumps and rotations impractical. The mean variance inflation factor for the log-log spline model is 132.68.³⁵ In the end, useful information is obtained nonetheless. The spline model is broken into a jump testing phase and a slope-change testing phase.

To test for jumps at the population size knots, the natural log of the number of interest groups is regressed on seven of the eight population size categories and the natural logs of the population, the number of governmental divisions, and the religious diversity measures.³⁶ It turns out that all significant jumps at the knots are positive jumps. The coefficient on the single negative

³⁴ See Appendix E for information about spline models. The spline model is also known as the "piecewise linear regression model."

³⁵ By rule of thumb, values greater than 10 or 20 are indicative of significant variance inflation.

³⁶ "Knots" are the minimum values in each of the size categories.

jump has a marginal significance level of 0.34. The mean variance inflation factor for this model form is 3.73.

To test for slope changes, the size indicator variables in the previous model are replaced by the interaction terms $\ln b2s03 - \ln b2s10$.³⁷ Size category nine, 1,000,000 to 1,500,000, has a negative slope change that is significant at the 10 percent significance level. This change is tiny relative to the positive slope in the omitted category, category three.³⁸ The estimated slopes for category three and category nine are 0.44 and 0.49 respectively. So, the slope actually increases despite the small negative change in going from category eight to category nine. The mean variance inflation factor for this model is 4.35.

This analysis indicates a positive, monotonic, piecewise-linear relationship exists between the number of interest groups and population. Therefore, the population per se hypothesis is resoundingly supported. Next, the relationship between the number of interest groups per capita and some other factors is explored.

4.2 Part Two: The Number of Interest Groups Per Capita

This part of the analysis tests the hypotheses not covered in part one of this paper. In this section, the dependent variable is the number of interest groups per capita ($n4pc$). The number of interest groups per capita is regressed upon 30 continuous regressors and eleven indicator variables.³⁹ The model is

³⁷ The interaction term is the product of the size indicator variable and the natural log of the reduced population variable. The reduced population variable is the population minus the respective category's knot.

³⁸ Category three: Population less than 50,000.

³⁹ Population size category indicator variables are not cascaded in this model.

estimated using ordinary least squares. The t-statistics are calculated using a robust standard error estimator with clustering by state.

With the exception of population density, all variables enter the model untransformed. A scatter plot of the population density (*popdensity*) versus the interest group density (*n4pc*) reveals an inverse relationship between the two variables. To accommodate this curvature, population density is sequentially raised to exponents between -0.05 and -1.0 at increments of 0.05. Raising the population density to -0.25 maximizes the adjusted R-squared value at 0.6179. As such, the variable *opopdensity* ($popdensity^{-0.25}$) is used in the model instead of *popdensity*.

Table 4. lists the elasticities for each regressor. The model explains 62 percent of the variation in promotional group density. The regression coefficients and other details are available in Appendix F. Regression results for the full OLS model with population density untransformed are provided in Appendix H.

Table 4

Promotional Interest Groups Per Capita Elasticity Calculations
Based on OLS Model

Independent Variable	t	p> t	Elasticity
<i>attyspc</i>	0.34	0.73	0.01
<i>chcountrcm</i> <i>spc</i>	-0.81	0.42	-0.04
<i>cntyage</i>	1.37	0.18	0.05
<i>crimert</i>	-0.42	0.68	-0.01
<i>decentral2</i>	-0.02	0.99	0.00
<i>dentistspc</i>	1.97	0.06	0.09
<i>divd</i>	0.38	0.71	0.01
<i>doctorspc</i>	-0.91	0.37	-0.03
<i>farm97pc</i>	4.4	0.00	0.13
<i>herf</i>	-5.55	0.00	-0.21
<i>infantmor</i>	0.3	0.76	0.01
<i>majindustries</i>	1.69	0.10	0.25
<i>midwest</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	1.34	0.19	0.08
<i>n3orgswochpc</i>	3.66	0.00	0.21
<i>northeast</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	-1.31	0.20	-0.10
<i>numgovs</i>	3.98	0.00	0.06
<i>p45to64</i>	-0.28	0.78	-0.06
<i>pabovepov</i>	3.09	0.00	1.17
<i>pcastndr</i>	-0.23	0.82	-0.02
<i>pclfp</i>	0.81	0.42	0.09
<i>percentadh</i>	2.92	0.01	0.24
<i>pfarmearn</i>	-2.08	0.04	-0.03
<i>pminority</i>	1.47	0.15	0.04
<i>popdensity</i>	4.12	0.00	-0.08
<i>pover65</i>	3.81	0.00	0.52
<i>prodwpc</i>	-0.18	0.85	0.00
<i>pseduc</i>	-1.35	0.19	-0.07
<i>psz04</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	-0.98	0.33	-0.03
<i>psz05</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	-1.2	0.24	-0.05
<i>psz06</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	-0.77	0.45	-0.05
<i>psz07</i> (chg from 0 to 1, % chg in <i>n4pc</i>)	-0.24	0.81	-0.02

Table 4

Promotional Interest Groups Per Capita Elasticity Calculations
Based on OLS Model (Continued)

Independent Variable	t*	p> t	Elasticity
<i>psz08 (chg from 0 to 1, % chg in n4pc)</i>	-1.19	0.24	-0.12
<i>psz09 (chg from 0 to 1, % chg in n4pc)</i>	-1.37	0.18	-0.23
<i>psz10 (chg from 0 to 1, % chg in n4pc)</i>	-1.68	0.10	-0.24
<i>punder18</i>	-0.37	0.72	-0.06
<i>reldiv</i>	-2.93	0.01	-0.16
<i>south (chg from 0 to 1, % chg in n4pc)</i>	-3.63	0.00	-0.26
<i>state_capital (chg from 0 to 1, % chg in n4pc)</i>	2.02	0.05	0.09
<i>vote part</i>	-2.12	0.04	-0.25
<i>wincomepc</i>	-0.66	0.51	-0.09
<i>wtotexp97pc</i>	4.77	0.00	0.09
* The t-statistics are calculated using a robust standard error estimator with clustering by state.			

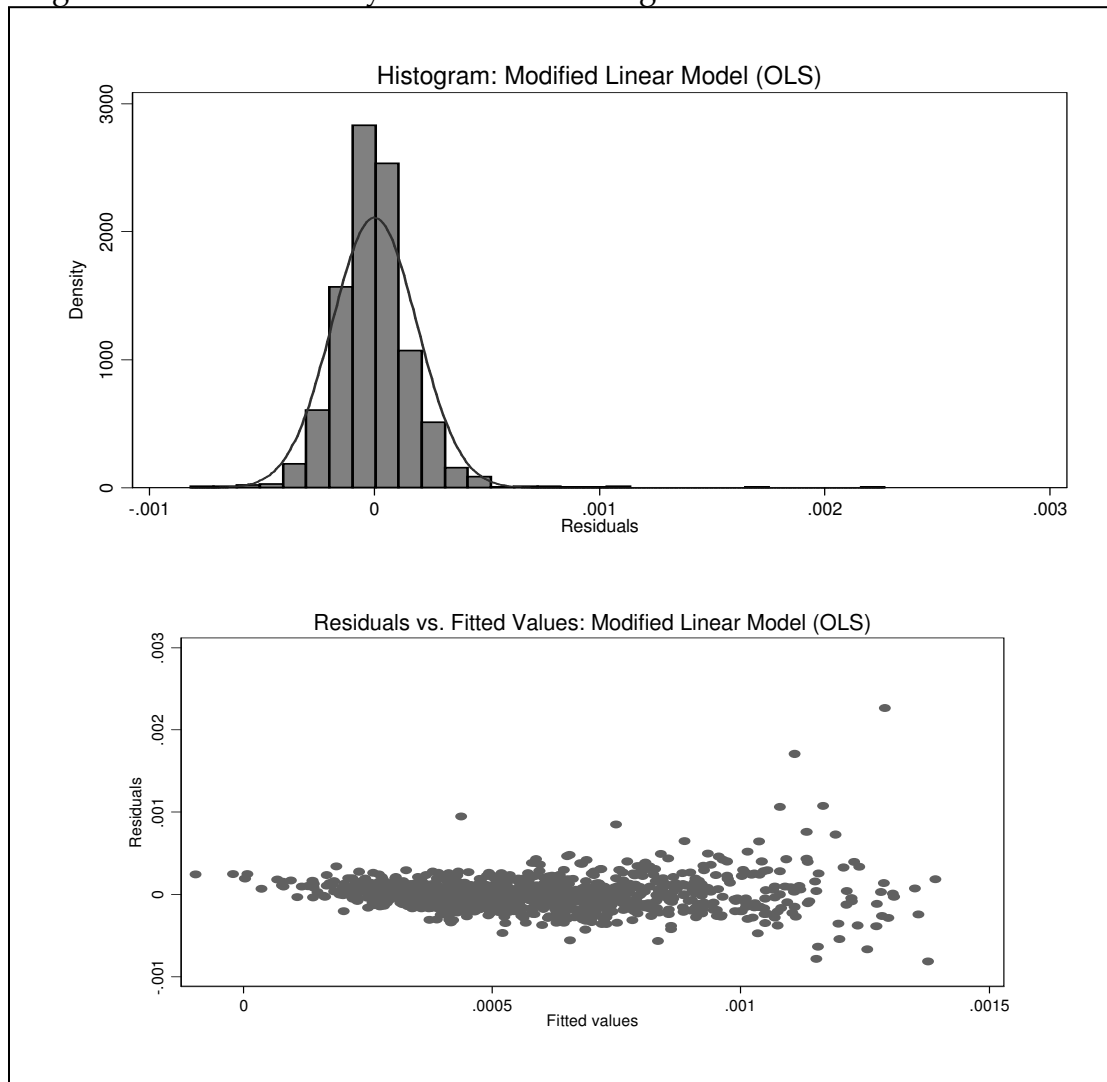
The negative elasticity associated with population density is reassuring. Ceteris paribus, as population increases in an area, the ratio of the number of groups to the population would be expected to decline unless the percentage change in the number of groups at least matched the percentage change in the population. If the percentage change in the number of groups matched the percentage change in the population, then the population elasticity of the number of groups would be 1.0. The results of the previous section show this elasticity is around 0.54. So the percentage change in the number of groups does not match the percentage change in the population. Thus, the findings of this section are consistent with those of the previous section.

Other than heteroscedasticity, the residual analysis reveals nothing of concern given the sample size.⁴⁰ Based on the Cook's distance criterion, no influential outliers exist in the final set of observations.⁴¹ Figure 1. shows the density distribution of the residuals and a plot of the residuals versus the predicted number of interest groups per capita.

⁴⁰ The t-statistics are calculated using a robust standard error estimator with clustering by state.

⁴¹ All Cook's distances are less than .90.

Figure 1. Residual Analysis of Part Two Regression Model



4.3 Part Two: Robustness Test

As a robustness check, the interest groups per capita regression is estimated using a fractional logit (FLOGIT) model specification.⁴² Twenty-five out of 41 of the OLS findings regarding coefficient significance are robust at the five percent significance level. Twenty-seven are robust at the 10 percent significance level.⁴³ Two determinants from the OLS regression are insignificant in the fractional logit regression. The findings for religious diversity and voter participation are not robust at the five percent significance level. The voter participation result is robust at the 10 percent significance level however. And, for religious diversity, the finding that the elasticity is negative is a robust finding.⁴⁴ Table 5. lists the non-robust findings. The standard error estimates are robust with clustering on the states. See Appendix F for more details on the robustness test.

⁴² Woolridge (1996) provides specifics on the fractional logit model. This is a generalized linear model optimized by maximum likelihood.

⁴³ Criteria for robustness:

1. At 10% significance level, determinations regarding the null hypothesis agree for both calculations. Both conclude the null hypothesis is rejected, or both conclude the null hypothesis is not rejected.
2. If both marginal significance levels are less than or equal to 0.10, the signs on the elasticities must agree for both calculations.
3. The two elasticities must be of the same order of magnitude generally. When both calculations are displayed in scientific notation, the exponents must not differ by more than 1.

⁴⁴ The religious diversity 95% confidence interval is [-9.26E-03, 1.42E-04] in the fractional logit model. Note: The OLS coefficients can not be directly compared to the fractional logit coefficients.

The two model specifications disagree on the significance of the seven population size categories.⁴⁵ The contrast is stark. The FLOGIT percentage change estimates are consistently two or more times greater in magnitude than the OLS estimates. Both estimates consistently agree the direction of the change is negative. The only other similarity in the two results is the “all-or-nothing nature” of the findings. All categories are significant, or all categories are insignificant. As such, no conclusions can be drawn concerning the importance of population size to interest group density.

At the five percent significance level, the findings for the number of major industries, the county age, the county decentralization measure, and the minority population percentage are not robust. Generally, the estimates are of the same order of magnitude, and they agree in sign. The marginal significance levels vary enough to lead to divergent conclusions at the five percent significance level however.

⁴⁵ The omitted size category is population less than 50,000. In this part of the empirical analysis, the size categories are not cascaded.

Table 5-Non-Robust Findings

Independent Variable	OLS ey/ex	FL ey/ex	OLS p> t	FL p> t	Robust at 10% s.l.	Robust at 5% s.l.
<i>reldiv</i>	-0.16	-0.05	0.01	0.42		
<i>vote part</i>	-0.25	-0.24	0.04	0.06	x	
<i>dentistspc</i>	0.09	0.05	0.06	0.16		x
<i>majindustries</i>	0.25	0.26	0.10	0.05	x	
<i>cntyage</i>	0.05	0.10	0.18	0.02		
<i>decentral2</i>	0.00	0.00	0.99	0.04		
<i>northeast*</i>	-0.10	-0.11	0.20	0.09		x
<i>pminority</i>	0.04	0.05	0.15	0.05		
<i>punder18</i>	-0.06	-0.23	0.72	0.06		x
<i>psz04*</i>	-0.03	-0.06	0.33	0.02		
<i>psz05*</i>	-0.05	-0.13	0.24	0.00		
<i>psz06*</i>	-0.05	-0.22	0.45	0.00		
<i>psz07*</i>	-0.02	-0.27	0.81	0.00		
<i>psz08*</i>	-0.12	-0.37	0.24	0.00		
<i>psz09*</i>	-0.23	-0.49	0.18	0.00		
<i>psz10*</i>	-0.24	-0.57	0.10	0.00		
(*) dy/dx is for discrete change of dummy variable from 0 to 1 and ey/ex is the percent change in predicted ymean.						

4.4 Part Two: Model Stability

To test for model stability a pooling test is conducted. A randomly generated variable is used to split the 1,234 observations of the modeling dataset into two datasets of 617 randomly selected observations each. The model is fitted using the two sets separately to produce model A and model B. The residual sums of squares (RSS) from the two models are totaled to acquire the unrestricted RSS (URSS) for the pooling test. The likelihood ratio test tests the hypothesis that all the parameters of model A are equal to all the corresponding parameters of model B. The critical value for the test statistic at the 5 percent significance level is 57.00. The calculated statistic is 51.12 and the marginal significance level is 0.13. Hence, the model is robust to random changes in the data subset at the 5 percent significance level. See Appendix G for more details on the pooling test.

5 Significant Determinants

5.1 Geo-political Determinants

According the OLS model's results, a one percent increase in county government expenditure per capita increases the predicted number of groups per capita by 0.09 percent (marginal significance level=0.00). This result seems to imply that more publicly provided resources, such as infrastructure and libraries, reduce the cost of, and perhaps increase the potential benefit of, acquiring influence. Where there is more government spending, perhaps there is more wealth available to redistribute. As such, more groups arise to compete for control of discretionary funds. In following this line of reasoning, caution is required however. Government spending levels are reported in nominal terms. Due to the lack of suitable indices, I cannot control for interarea cost-of-living differences with precision in this project.⁴⁶ To control for interarea cost-of-living differences to some degree, inflationary indices proxy for interarea indices. Nominal dollar values are adjusted by the regional, seasonally-unadjusted, annual, urban consumer price index for 2000 as reported by the Bureau of Labor Statistics.

In contrast to government expenditure, on the per capita basis, a one percent increase in voter participation reduces the predicted number of interest

⁴⁶ Because this analysis is cross-sectional in nature, purchasing-power differences across polities arises as a central issue. Governments in relatively high-cost areas may deliver fewer goods and services in real terms than governments in lower-cost areas even though the high-cost-area governments spend more in nominal terms. Interarea cost-of-living indices account for these differences in purchasing power.

groups by 0.26 percent (marginal significance level=0.04).⁴⁷ This finding implies that low voter turnout shrinks the cost of influence relative to the potential returns to influence and thus encourages more group formation. Apathy on the part of the un-mobilized, latent group (citizens 18 years old and over) appears to encourage more special interests to mobilize.

On the other hand, the existence of charities encourages more group formation. A one percent increase in the number of charities per capita is consistent with a 0.21 percent increase in interest groups per capita (marginal significance level=0.00). Having more charities implies greater opportunities for organizations to share resources, more volunteerism, and perhaps higher levels of charitable giving per capita. All of these factors reduce opportunity costs relative to potential benefits; having lower costs leads to the formation of more nonprofit organizations.

Likewise, counties covering larger numbers of cities, towns, special districts, and school districts have higher densities of interest groups. Since policy decisions are made at all levels of government, each individual government is a potential focal point for lobbying. Also, for many interests, it is more cost effective to lobby at the local or district level than at higher levels, thus where effective, these interests locate nearer to the local government officials. For every one percent increase in the number of governments, a 0.06 percent increase in the number of interest groups per capita (marginal significance level=0.00) is expected.

⁴⁷ The voter participation rate elasticity is estimated at -0.24 with a marginal significance level of 0.06 in a robustness check using a fractional logit model specification. The findings of the primary regression and the fractional logit regression are very similar.

Counties hosting state capitals have nine percent more interest groups per capita than non-hosting counties (marginal significance level=0.05). These counties are effectively state-level-political-influence market places, lobbying hubs. Locating in these counties reduces the cost of lobbying at the state level for parties residing in areas geographically removed from the capitals. Likewise, these areas generally have more and better public resources, such as libraries and transit systems. Additionally, they tend to house more agencies providing public information and assistance than do other counties.

Southern counties have about 26 percent fewer interest groups per capita than do western counties (marginal significance level=0.00). Northeastern counties and Midwestern counties have essentially the same number of interest groups per capita as Western counties. This regional difference is substantial; unfortunately, I can offer no insight as to why it exists.

I can, however, offer this observation about political power in the South. Thomas and Hrebenar (1999) classified nine states as being politically dominated by interest groups.⁴⁸ Despite having lower interest group densities on average, seven Southern states are included in those nine politically dominated states. The included Southern states are Alabama, Florida, Louisiana, Mississippi, South Carolina, Tennessee, and West Virginia.⁴⁹ These states are also found to have

⁴⁸ Thomas and Hrebenar (1999) are cited by Shughart, Tollison, and Yan (2003). Thomas and Hrebenar used questionnaires completed by political scientists in each state to assess interest group power within the state. Their study includes trade associations, civic leagues, social welfare organizations, government agencies, cities, towns, churches, and colleges as interest groups. Thomas and Hrebenar's approach to measuring relative interest group power is a well-established methodology in political science literature.

⁴⁹ Alaska and New Mexico are the two non-Southern states said to be politically dominated by interest groups.

more disparate income distributions than other states (Shughart, Tollison, and Yan 2003). Conceivably within any state, competition among equally-powerful interest groups prevents the emergence of observable indicators of political dominance (Becker, 1983). Likewise, having groups of unequal power or a prevalence of unopposed groups encourages the emergence of indicators of dominance.

5.2 Religious Determinants

Having a large number of religious denominations in an area seems to discourage interest group formation. Likewise, dominance of the religious marketplace by a small number of denominations is correlated with fewer interest groups. The religious diversity measure and the religious concentration measure have marginal significance levels of 0.01 and 0.00 respectively.⁵⁰ A one percent increase in the number of denominations decreases the predicted number of interest groups per capita by 0.16 percent.⁵¹ A one percent increase in religious market concentration decreases the expected number of interest groups per capita by 0.21 percent. Conceivably, these decreases are due to substitution toward religious activity away from group formation. Rather than forming as independent units in the community at large, when a powerful, influential

⁵⁰ The Herfindahl index measures the denominational market concentration. The Herfindahl index is the sum of the squares of the market shares of all of the denominations in a county based on adherence figures.

⁵¹ The religious diversity elasticity is estimated at -0.05 with a marginal significance level of 0.42 in a robustness check using a fractional logit model specification. The finding that the elasticity is negative is a robust finding for the most part. The 95% confidence interval of the fractional logit estimation includes a small positive range. The finding that the coefficient varies significantly from zero is not robust.

religious base exists, collectives may well find it more efficient to form as goal-specific auxiliaries within a church.

Additionally, it turns out that a one percent increase in the fraction of the population adhering to religion (any denomination) increases the expected number of interest groups per capita by 0.24 percent. Therefore, adherence is positively correlated with the number of interest groups per capita. Its marginal significance level is 0.01. The three findings for the religious measures, taken together, seem to indicate that jurisdictions having high numbers of adherents evenly dispersed among relatively few denominations will experience higher numbers of interest groups.

5.3 Demographic Determinants

The number of interest groups cannot increase in direct proportion to population increases in nominal terms. It is a mathematical reality. Because a collective is comprised of at least two or more people by definition, a count of the number of collectives formed will always substantially lag the population count. Likewise, increases in the number of interest groups will always substantially lag increases in the population.

However, the percentage change in the number of groups can match the percentage change in the population. But, the population elasticity of the number of interest groups is found to be an inelastic 0.56 (marginal significance level=0.00), so indications are that this match does not occur as one moves from one jurisdiction to another. Similarly, the population density elasticity of the number of interest groups per capita is inelastic. A one percent increase in population density leads to a 0.08 percent decline in the number of interest

groups per capita (marginal significance level=0.00). This finding says that urbanization either decreases the benefits of acquiring political influence or it raises the opportunity costs. It could be that it does both. The specific economics of this result are not apparent.

On the other hand, what is going on with people over the age of 65 is more apparent. Having a large pool of people over the age of 65 lowers the opportunity cost of mobilization. This segment of the population includes large numbers of retirees. Since retirees generally receive no wages, their opportunity cost of volunteering is relatively low. A one percent increase in the percentage of people over the age of 65 increases the number of interest groups per capita by 0.52 percent (marginal significance level=0.00).

The significant socioeconomic measures are the number of farms per capita, the percentage of earnings from farming, and the percentage of the population above the poverty level. Farms per capita is a proxy for the number of farmers per capita. Farmers per capita is a middle-class human-capital determinant. A one percent increase in farms per capita increases the number of interest groups per capita by 0.13 percent (marginal significance level=0.00). Similarly, a one percent increase in the fraction of the population above the poverty level increases the number of interest groups per capita by 1.17 percent. These results indicate that low income, in and of itself, does not equate to low opportunity cost per se. The relative opportunity cost for an impoverished person can be quite high compared to that of a middle-class individual. Recall that the marginal value of a dollar increases as the number of dollars decreases.

The percentage of earnings from farming is found to be negatively correlated with interest group density. A one percent increase in the farm

earnings measure decreases the density by .03 percent. Since percentage of earnings from farming is presumed to be inversely related to socioeconomic development, this finding indicates a positive correlation between socioeconomic development and interest group density. On the other hand, the high-status human capital measures (the number of doctors, dentists, and attorneys per capita; and the percentage of the population with four-year degrees) did not correlate strongly with interest group density. Thus, high socioeconomic status is not conducive to group formation in all instances. Considering the findings for all socioeconomic measures as a whole, it follows that the middle-class is the group most indicated for initiating special interest groups.

5.4 Absence of Income Per Capita as a Determinant

Income per capita, the last of the socioeconomic indicators, receives special scrutiny. Because it does not account for interarea cost-of-living differences, income per capita is not necessarily a good relative measure of discretionary income. If it is the discretionary income level that is important in characterizing socioeconomic development, income per capita adjusted by an appropriate cost-of-living factor is a better measure of socioeconomic development than the unadjusted income per capita.

Interarea cost-of-living indexes are uncommon and much debate still remains as to how they are best calculated. Aten (2002) reports interarea cost-of-living indexes for a limited number of U. S. counties. After merging Aten's information with the original dataset, 207 observations are available for analysis

using the OLS model and the interarea consumer price indexes.⁵² Given the 16 parameters to estimate in the final model, 207 observations are inadequate for reaching strong conclusions. Nevertheless, using them provides additional insight.

To see if cost-of-living adjustments impact my findings, I run two regressions using the 207 observations. One uses unadjusted income per capita and unadjusted government spending per capita while the other uses adjusted income per capita and adjusted government spending per capita. This is the only difference in the two regressions.⁵³ The marginal significance level of the unadjusted income is 0.42; the marginal significance level of the cost-of-living adjusted income is 0.19. A decrease in the marginal significance level of this magnitude, 0.23, can alter conclusions in practice under certain circumstances. So, the absence of income per capita in the final model is not strong evidence that income levels are insignificant as determinants of interest group formation patterns.

5.5 Absence of County Age and Community-Need Gauges

The county age measure (*cntyage*) is insignificant at the five percent significance level. County age is included to test the hypothesis “*The number of interest groups per capita in a county is positively related to the length of time that the county has been chartered.*” This hypothesis stems from Olson’s (1982) accumulation theory. A cross-sectional study, such as this, provides a weak

⁵² To preserve degrees of freedom, only variables found to be significant at the 5% significance level were included in the model for the ICPI experiment.

⁵³ *Adjusted income* = (*incomepc/icpi*), where *icpi* is the interarea consumer price index.

testing ground for an accumulation theory. Ideally, an accumulation hypothesis is tested using time-series analysis with a more refined unit of observation like a town or a city. With time-series analysis, more reliable conclusions about the life cycles of interest groups are likely to emerge.

The percentage of the population under the age of 18 and the crime rate (*punder18* and *crimert*) are not significant at the five percent significance level. These variables test the hypothesis “*The number of interest groups per capita will be related to unmet community needs.*” This hypothesis is adapted from Weisbrod’s (1988) assertion that non-profit organizations form in response to unmet community needs. However, if need-responsive groups do form where need is high, and if these need-responsive groups successfully reduce community need over time, it is conceivable that an insignificant or negative correlation between community need and interest group density will emerge in a cross-sectional study. Thus, a time-series analysis is needed to properly test the community-need theory. A cross-sectional analysis cannot detect a causal relationship between community need and group density.⁵⁴

5.6 The Absence of Other Independent Variables

At the five percent significance level, other variables not previously discussed in this section failed to emerge as significant. In the OLS regressions, almost certainly, the dependent variable choices influence the findings for a number of independent variables. The number of industries (*majindustries*), the minority percentage of the population (*pminority*), the ethnic diversity (*divd*), the

⁵⁴ The question “Does community need Granger-cause interest group density?” can not be answered with cross sectional data.

decentralization measure (*decentral2*), and the work force participation rate (*pclfp*) might have been significant had trade association or charity data been used instead of promotional interest group data. The theories corresponding to these variables are likely to find support in specialized studies considering different regressands. Even in this study, the insignificant findings for the number of industries, the decentralization measure, and the minority percentage of the population lack robustness at the five percent significance level.

6 Conclusions And Recommendations

6.1 The Theories

Now that the numbers have been compiled and examined, it is confirmed that interest group density varies from county-to-county across the U.S.⁵⁵ The variation in density is not random. Economic literature contains numerous theories concerned with explaining this variation in density. Twelve of these theories are the focus of this study. One important point of this research is to separate the more useful of these theories from the less useful.

Some of these theories gain no support from this analysis. At the five percent significance level, the testable hypotheses drawn from these theories are rejected, because the specific variables used to test the hypotheses are found to be insignificant when controlling for a host of other variables in the prescribed manner. In particular, no support materialized for theories linking formation patterns to community factors such as the crime rate, the degree of ethnic diversity, the infant mortality rate, the fraction of the population between the ages of 45 and 54, or the fraction of the population below the age of eighteen.

Additionally, support failed to materialize for Macridis's (1961) theory linking increases in religious diversity to increases in interest group density. At the five percent significance level, the religious diversity measure is significant in the OLS estimation but its elasticity is negative. The estimated elasticity is -0.16. For the record, when the dependent variable is the number of interest groups as opposed to the number of interest groups per capita, Macridis's theory finds

⁵⁵ Interest group density is the number of interest groups per capita= $n4pc=n4/b2_pop01$.

support. Controlling for population, the number of distinct regions, and religious concentration, the estimated elasticity is 0.43.

Support failed to materialize for the hypothesis adapted from Dahl's (1971) prediction linking increases in civic participation opportunity to increases in interest group numbers.⁵⁶ The testable hypothesis I formulated substituted civic participation for civic participation opportunity. The civic participation measures are voter participation (*votepart*) and support for third party candidates (*pcastndr*). The hypothesis states that both measures increase as the interest group density increases. At the five percent significance level, voter participation is significant with an elasticity of -0.26, while support for third party candidates is insignificant.⁵⁷ Therefore, there is support for an alternate hypothesis: Voter participation decreases as interest group density increases.

Based the OLS model estimates, at the five percent significance level, support failed to materialize for theories linking the number of interest groups per capita to the number of industries, government decentralization, county age, or percentage minority population.⁵⁸ The signs on the elasticities are supportive of the theories at issue, but the coefficients did not vary significantly from zero. The fractional logit robustness check indicated that each of these variables is

⁵⁶ Dahl's theory related to increasing opportunity to oppose the status quo and to vote one's preference, not voter participation or candidate selection per se. Hypothesis 8. *the number of interest groups per capita increases with the degree of voter participation and support for "third party" candidates*, is adapted for the U.S. where variability of opportunity is minimal. Therefore Dahl's theory is not tested, and as such is not rejected or supported, by this research.

⁵⁷ The dependent variable is the number of interest groups per capita.

⁵⁸ If the dependent variable were the number of trade associations or the number of trade associations per capita, support for Dahl and Tufte's theory would have been more likely to materialize.

significant at the five percent significance level, however. As such, no strong conclusions can be drawn regarding the veracity of these theories from this study as designed.

Other theories are supported in part. At the five percent significance level while controlling for the prescribed host of variables, at least one variable testing the hypotheses related to these theories is significant with an appropriately supporting sign (+/-) on the estimated elasticity.

Those theories linking interest group density to the availability of financial capital and specific types of human resources or human capital fall into the supported-in-part category.⁵⁹ On the financial side, supporting these theories are the findings for government spending per capita (*totexp97pc*) and the percentage of the population above poverty (*pabovexpov*). Both are significant and positively correlated with interest group density. The elasticities are 0.09 and 1.17 respectively. On the human resources side, supporting these theories is the finding of a significant, positive elasticity for the percentage of the population over 65 years of age. The estimated elasticity is 0.52. Gronbjerg and Paarlberg (2001) predict this type of relationship for the percentage of the population between the ages of 45 and 54. They have the wrong age group, but the right idea about the availability of human resources. When it comes to interest group formation, those over the age of 65 have a comparative advantage over their middle-aged counterparts. Additionally, Gronbjerg and Paarlberg's calculation

⁵⁹ These are the socioeconomic and supply-side theories by Salisbury (1975), Lincoln (1977), Corbin (1999), and Gronbjerg and Paarlberg (2001); the variables of interest: *pseduc*, *dentistspc*, *doctorspc*, *attyspc*, *farm97pc* (a proxy for farmers per capita), *infantmor*, *incomepc*, *pabovexpov*, *totexp97pc*, *p45to64*, *percentadh*, and *pover65*.

that interest group density increases with religious affiliation is supported; the estimated elasticity for the percentage of the population adhering to religion (*percentadh*) is 0.24.

The theories relating interest group density to community structure also fall into the partly-supported theories category.⁶⁰ Supporting these theories are the findings for the population density (*popdensity*), the charities per capita (*n3orgswochpc*), and the state capital county (indicator=*state_capital*) variables. Their elasticities are -0.08, 0.21, and 0.09 respectively.⁶¹

Theories supported in full make up the final category of theories. At the five percent significance level while controlling for the prescribed host of variables, all variables testing the hypotheses related to these theories are significant with an appropriately supporting sign on the estimated elasticity.

Eckstein's (1963) theory linking the size of government to interest group density is fully supported. Government spending per capita (*totexp97pc*) is found to be positively correlated with interest group density. The estimated elasticity is 0.09. Similarly, Dahl and Tufte's (1973) claim that more distinct regions implies more interest groups is fully supported. The claim is supported with respect to interest group density and with respect to the number of interest groups. The elasticity for the number of distinct governments in a county (*numgovs*) is 0.06 for the density case (Part Two analysis) and 0.20 for the number case (Part One analysis). Likewise, Murrell's (1984) theory suggesting the number of interest

⁶⁰ The structural theories are by Lincoln (1977), Wolch and Geiger (1983), and Gronbjerg and Paarlberg (2001); the variables of interest: *cntyage*, *n3orgswochpc*, *pclfp*, *popdensity*, *prodwpc*, *state_capital*, and *psz04-psz10*.

⁶¹ *State_capital* is an indicator variable. The coefficient on *state_capital* divided by the mean predicted value of *n4pc* is reported rather than a figure for elasticity.

groups increases with population, independently of the number of distinct regions and the population heterogeneity, is fully supported. Controlling for the number of distinct regions; the religious diversity; and the religious concentration, the estimated population elasticity of the number of interest groups is 0.56.

6.2 The Determinants

One more important point of this research is to separate the more useful independent variables from those less useful. To this end, much has been accomplished. Geo-political, religious, and demographic measures important to interest group formation are identified. The important geo-political measures are the number of distinct regions/governments, government spending per capita, the level of voter participation, the number of charities per capita, the region of the country, and the locations of power centers such as national capitals, state capitals, and county seats. The important religious measures are the percentage of the population adhering to religion, the number of religious denominations practicing, and the level of concentration present in the religious market.⁶² The important demographic measures are the population density, the percentage of the population above the poverty level, the percentage of the population over the age of 65, the percentage of earnings derived from farming, and the number of farms (or farmers) per capita.

Under the specifics of this analysis, a one percent increase in county government expenditure per capita increases the predicted number of groups

⁶² The religious-diversity elasticity is estimated at -0.05 with a marginal significance level of 0.42 in a robustness check using a fractional logit model specification.

per capita by 0.09 percent, implying that more publicly provided resources increases the potential benefits of acquiring influence relative to the cost of acquiring influence. In contrast to government expenditure, on the per capita basis, a one percent increase in voter participation reduces the predicted number of interest groups by 0.26 percent, implying that apathy on the part of the unmobilized, latent group (citizens 18 years old and over) encourages more special interests to mobilize.⁶³

Having a religious marketplace dominated by a small number of denominations or having a large number of religious denominations discourages interest group formation. A one percent increase in the number of denominations decreases the number of interest groups per capita by 0.16 percent. A one percent increase in religious market concentration decreases the expected number of interest groups per capita by 0.21 percent. Conceivably, when a powerful, influential religious base exists, collectives find it more efficient to form as auxiliaries within churches rather than as independent bodies. Also, a one percent increase in the fraction of the population adhering to religion increases the expected number of interest groups per capita by 0.24 percent. It seems that jurisdictions having higher numbers of adherents evenly dispersed among relatively few denominations will experience higher numbers of interest groups.

On average, Southern counties have about 26 percent fewer interest groups per capita than do western counties. Counties located in the Northeast

⁶³ The voter participation rate elasticity is estimated at -0.24 with a marginal significance level of 0.06 in a robustness check using a fractional logit model specification. The findings of the OLS regression and the FLOGIT regression are very similar.

and the Midwest have essentially the same number of interest groups per capita as Western counties. This regional difference is substantial and the reason for this gap is a mystery.

6.3 Recommendations for Future Research

There are a number of possible research projects that would supplement the study of interest group activity well. For example, a rigorous examination of the factors accounting for the stark contrast in formation patterns between the West and the South is in order. Also, to assess the economic impact of churches as political interest groups, an examination of the relationship between religious variables and government spending is needed. By the same token, to quantify the political impact of local special interests, a study of regulatory activity and how it relates to interest group number, size, and wealth is required.

Also, since it is noted that senior citizens are significant to the formation process, it makes sense to analyze their impact on local school funding and funding for other public programs providing fewer senior-directed services. The question posed: Are seniors responsible for the state of public education in America? Poterba (1998) cites evidence of a negative correlation between support for public school spending and the fraction of the population above 55. Alternatively, Berkman and Plutzer (2004) find senior concentration is beneficial to public school funding in districts featuring long-time senior residents. In districts featuring large influxes of migratory seniors, Berkman and Plutzer (2004) find negative impacts to public school funding.

And finally, to settle the question of Granger causality between the prevalence of interest groups and government spending, a multivariate time

series study is indicated. Clearly, far more remains to be learned about the economic implications of the freedom to assemble.

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Appendix A

Record culling and modification process

The Tax Year 2000 IRS Business Master Files extract was obtained from the National Center for Charitable Statistics (NCCS) of the Urban Institute in Washington, DC. The extract contained records for active 501 (c) (3) and 501 (c) (4) organizations that had filed forms 1023 (Application for Recognition of Exemption Under Section 501 (c) (3) of the Internal Revenue Code) and 1024 (Application for Recognition of Exemption Under 501 (a)). The NCCS added the state and county Federal Information Processing Standard (FIPS) codes to the organization-level tax records. The FIPS code is a five digit number. The state FIPS code is the first two digits of the five. The county FIPS code is the last three digits of the five. The FIPS codes are used to map the organizational counts to census and other county-level data records. There were 848,590 records in the initial extract. SAS version 9.0 was used to cull and modify the records.

All records with addresses outside the 50 U.S. states are discarded. This included records with addresses in U.S. territories, with military addresses, with foreign addresses, and with District of Columbia addresses.

Three thousand six hundred twelve (3,612) of the remaining records were missing FIPS codes. Rather than discard these records, zip code and locale mapping tools were used locate as many missing FIPS codes as possible. Sources included the websites <http://www.census.gov/geo/www/gazetteer/places2k.html>, <http://www.census.gov/govs/www/gid.html>, http://www.naco.org/Template.cfm?Section=Find_a_County&Template=/cfiles/counties/citiesstateall.cfm, <http://www.irss.unc.edu/irss/researchdesignservices/researchdeslinks/counties.asp#CA>.

Some zip codes could not be located in any of the resources utilized. In some cases, due to the nature of how some counties are defined, pinpointing an exact county for an address is not feasible. Special care was taken not to discard any 501 (c) (4) organizations. Nonetheless, a couple are discarded. One Humbolt, TN record is disregarded because I could not determine if it resides in Gibson or Madison County, TN. One Maple Plain, MN record is discarded because I could not determine if it resides in Wright or Hennepin County, MN. An additional 44 501 (c) (3) records were discarded due to similar problems.

The core census data is provided for 3,140 counties by FIPS. Some records remaining in the dataset had FIPS codes that did not match the 3,140 codes of interest. Four records are discarded for this reason (FIPS: 07035, 07065, 07067, and 07079); there is no way to assign them to a county. 145 records were originally listed under FIPS 08014; this code is not one of the 3,140 of interest per se. All addresses for these records are in two cities, Bloomfield, CO and Westminster, CO. These two cities are split between four counties (Weld, Adams, Jefferson, and Boulder). Rather than discard the 145 records, their counts are divided evenly between the four counties with the odd count going to Jefferson County, the largest of the four counties. Due to changes in FIPS

codes between tax filing periods, FIPS 12086 (Dade County, FL) is not in the 3,140 codes of interest. Miami-Dade County, 12025 is listed however. 5,159 records were moved from 12086 to 12025. Prior to this move, the 12025 FIPS had a total of two 501 (c) (3) organizations listed.

The remaining 834,970 records (all with FIPS codes) are sorted by type [charities (501 (c) (3)) and advocacy groups (501 (c) (4))], counted by FIPS, and then merged by FIPS to produce a 3,140 record dataset.

An adjustment is made to the Polk County, Iowa count. A single organization has an unusually high number of affiliated records (5,600). The count for that organization is reduced to one. Des Moines, Iowa is in Polk County.

Data from the population census of 2000, the government census of 1997, and other sources were merged by FIPS to complete the dataset. Population data is available for all 3,140 counties, but information on other variables is not as complete. Only 1,257 of the 3,140 records contained all 25 continuous independent variables needed in the promotional-groups-per-capita analysis.

For 22 records, the proxy for the civilian labor force rate exceeds 1.0 (100 percent). Those records are discarded.

One influential outlier is removed from the set. Edgefield, South Carolina has a Cook's distance of 1.49 where the critical value is 0.99. It has many DFBETA values that greatly exceed the critical value of 0.057. I suspect there is a typographical error in the source information. Based on the Cook's distance, no other influential outliers exist.

Forty-seven of the 50 states are represented in the 1,234 records remaining. No government census information is available on Rhode Island, Connecticut, or Alaska.

Appendix B

Data Sources

Table B-1. Data Sources

Variable	Variable Sources
<i>attyspc</i>	2000 County Business Patterns-Census Bureau
<i>chcountrcm_{spc}</i>	Jones (2002), Religious Congregations...2000
<i>b2_pop01</i>	2000 County Data Book-Census Bureau
<i>cntyage</i>	Kane and Aiken (2005), <i>The American Counties</i>
<i>crimert</i>	2000 County Data Book-Census Bureau
<i>decentral2</i>	1997 Government Census-Census Bureau
<i>dentistspc</i>	2000 County Business Patterns-Census Bureau
<i>divd</i>	2000 County Data Book-Census Bureau
<i>doctorspc</i>	2000 County Business Patterns-Census Bureau
<i>farm97pc</i>	2000 County Data Book-Census Bureau
<i>Herf</i>	Jones (2002), Religious Congregations...2000
<i>icpi</i>	Aten (2005), Report on Interarea Price Levels
<i>incomepc</i>	2000 County Data Book-Census Bureau
<i>infantmor</i>	2000 County Data Book-Census Bureau
<i>lnb2pop01</i>	2000 County Data Book-Census Bureau
<i>m</i>	Aten (2005), Report on Interarea Price Levels
<i>majindustries</i>	2000 County Business Patterns-Census Bureau
<i>n</i>	Aten (2005), Report on Interarea Price Levels
<i>n3orgswochpc</i>	2000 IRS Business Master Files
<i>numgovs</i>	1997 Government Census-Census Bureau
<i>n4</i>	2000 IRS Business Master Files
<i>n4pc</i>	2000 IRS Business Master Files
<i>p45to64</i>	2000 County Data Book-Census Bureau

Table B-1. Data Sources (Continued)

<i>pabovepov</i>	2000 County Data Book-Census Bureau
<i>pcastndr</i>	ICPSR 2896-Part 82: 1998 USA COUNTIES PART A
<i>pclfp</i>	2000 County Data Book-Census Bureau
<i>percentadh</i>	Jones (2002), Religious Congregations...2000
<i>pfarmearn</i>	2000 County Data Book-Census Bureau
<i>pminority</i>	2000 County Data Book-Census Bureau
<i>popdensity</i>	2000 County Data Book-Census Bureau
<i>pover65</i>	2000 County Data Book-Census Bureau
<i>prodwpc</i>	2000 County Data Book-Census Bureau
<i>pseduc</i>	2000 County Data Book-Census Bureau
<i>psz03</i>	2000 County Data Book-Census Bureau
<i>psz04</i>	2000 County Data Book-Census Bureau
<i>psz05</i>	2000 County Data Book-Census Bureau
<i>psz06</i>	2000 County Data Book-Census Bureau
<i>psz07</i>	2000 County Data Book-Census Bureau
<i>psz08</i>	2000 County Data Book-Census Bureau
<i>psz09</i>	2000 County Data Book-Census Bureau
<i>psz10</i>	2000 County Data Book-Census Bureau
<i>punder18</i>	2000 County Data Book-Census Bureau
<i>reldiv</i>	Jones (2002), Religious Congregations...2000
<i>s</i>	Aten (2005), Report on Interarea Price Levels
<i>state_capital</i>	Book of the States, 2005 Edition
<i>totexp97pc</i>	1997 Government Census-Census Bureau
<i>votepart</i>	ICPSR 2896-Part 82: 1998 USA COUNTIES PART A
<i>w</i>	Aten (2005), Report on Interarea Price Levels

Appendix C

Statistical Summary of Variables

Table C-1: Variables Summary Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max	Correlation with <i>n4pc</i>
<i>n4pc</i>	1234	0.000566	0.000311	0	0.003554	1.0
<i>popdensity</i>	1234	167.4742	343.7552	1.4	7286.7	-0.211
<i>totexp97pc</i>	1234	0.77564	0.589502	0.0065	4.143679	0.0183
<i>decentral2</i>	1234	6.98149	22.72001	0.276987	538.5941	-0.0353
<i>cntyage</i>	1234	169.0583	44.99572	39	366	-0.107
<i>incomepc</i>	1234	21936.39	4545.964	10258	52869	0.0009
<i>pseduc</i>	1234	13.7907	6.356179	3.7	52.3	-0.1152
<i>pabovepov</i>	1234	85.90073	5.701916	60.3	97.3	0.2513
<i>infantmor</i>	1234	7.235599	4.466979	0	32.5	-0.1041
<i>attyspc</i>	1234	0.000415	0.000189	0	0.001303	0.016
<i>dentistspc</i>	1234	0.000308	0.00013	0	0.000882	0.1541
<i>doctorspc</i>	1234	0.000473	0.00027	0	0.001511	-0.1612
<i>pminority</i>	1234	16.99061	16.25234	0.7	88.4	-0.3801
<i>divd</i>	1234	0.48392	0.201228	0.125	0.875	-0.284
<i>votepart</i>	1234	52.39805	8.2188	23.72222	77.64527	0.3974
<i>pcastndr</i>	1234	11.08148	3.561408	2.41772	30.53941	0.3767
<i>pclfp</i>	1234	0.740533	0.099787	0.344751	0.99955	0.0072
<i>pover65</i>	1234	14.09636	3.544707	4.9	34.7	0.4424
<i>punder18</i>	1234	25.55283	2.810939	15.7	38.9	-0.1639
<i>p45to64</i>	1234	23.08123	2.219104	14.4	30.8	0.1852
<i>crimert</i>	1234	3195.951	1700.15	45	11115	-0.28
<i>farm97pc</i>	1234	0.018848	0.0179	5.74E+06	0.12642	0.5337
<i>pfarmearn</i>	1234	3.787621	5.464073	0	42.4	0.1371
<i>majindustries</i>	1234	23.31634	2.117081	5	25	-0.0494
<i>prodwpc</i>	1234	0.06571	0.042874	0.002142	0.343941	0.0886
<i>state_capital</i>	1234	0.01699	0.129287	0	1	-
<i>n3orgswochpc</i>	1234	1234	0.0019	0.00091	0.00013	0.4486
<i>numgovs</i>	1234	31.9256	31.3174	0	377	0.0574
<i>herf</i>	1234	0.31721	0.15275	0.07425	0.98085	-0.3187
<i>reldiv</i>	1234	24.3026	12.8371	3	102	-0.1895
<i>chcountrcmspc</i>	1234	0.00172	0.00089	0.00035	0.0061	0.2215
<i>percentadh</i>	1234	0.50783	0.15515	0.13343	1.03984	0.2603

Appendix D

Part One: Regression Results

Dependent Variable:

Log of Number of Promotional Interest Groups, *lnn4*

Linear regression (OLS)

West, w, is the omitted region.

Number of obs=3087

F(6, 49)=295.42

Prob>F=0.0000

Rsquared=0.8544

Root MSE=0.4579

Mean Variance Inflation Factor is 3.31.

Number of clusters (state)=50

	Elasticity.	Robust Std.Err.	t	P>t	[95% Conf. Interval]	
<i>lnb2pop01</i>	0.5557	0.03272	16.98	0.000	0.490	0.621
<i>n</i>	0.0907	0.08709	1.04	0.303	-0.084	0.266
<i>s</i>	-0.1926	0.11499	-1.67	0.100	-0.424	0.039
<i>m</i>	0.0337	0.08837	0.38	0.705	-0.144	0.211
<i>lndivd</i>	0.0413	0.05310	0.78	0.440	-0.065	0.148
<i>lnmajindustries</i>	0.0568	0.07981	0.71	0.480	-0.104	0.217
<i>lnreldiv</i>	0.4232	0.05991	7.06	0.000	0.303	0.544
<i>lnnumgovs</i>	0.1259	0.07285	1.73	0.090	-0.021	0.272
<i>lnherf</i>	-0.1808	0.05105	-3.54	0.001	-0.283	-0.078
<i>cons</i>	-4.7427	0.38979	-12.17	0.000	-5.526	-3.959

ROBUSTNESS CHECK

Dependent Variable: Number of Promotional Interest Groups, *n4*

Poisson regression (ML)

West, w, is the omitted region.

Number of obs=3122

Wald chi2(9) = 10188.25

Prob>Chi2=0.0000

Log pseudolikelihood = -12629.766

Number of clusters (state)=50

Goodness-of-fit chi2 = 10848.03

Prob > chi2(3112) = 0.0000

	Elasticity.	Robust Std.Err.	z	P>z	[95% Conf. Interval]	
<i>lnb2pop01</i>	0.62	0.028	22.08	0.00	0.568	0.679
<i>n</i>	0.07	0.060	1.15	0.25	-0.048	0.185
<i>s</i>	-0.16	0.059	-2.68	0.01	-0.276	-0.043
<i>m</i>	-0.01	0.049	-0.27	0.79	-0.109	0.083
<i>lndivd</i>	-0.03	0.037	-0.93	0.35	-0.108	0.039
<i>lnmajindustries</i>	0.09	0.103	0.83	0.41	-0.117	0.288
<i>lnreldiv</i>	0.40	0.077	5.22	0.00	0.251	0.553
<i>lnnumgovs</i>	0.08	0.032	2.63	0.01	0.021	0.148
<i>lnherf</i>	-0.12	0.029	-3.95	0.00	-0.172	-0.058
<i>cons</i>	-5.27	0.360	-14.67	0.00	-5.980	-4.570

Appendix E

Spline Model Form--Regression Details for Interaction and Intercept Terms

Spline Model Form

General Piecewise Regression Model:

$$y = \beta_0 + \beta_1 x + \beta_2(x - z_1)x_1 + \dots + \beta_n(x - z_n)x_n + \gamma_1 x_1 + \dots + \gamma_n x_n + \epsilon, \quad \text{where}$$

$i = 1, 2, 3, \dots, n;$

y = dependent variable;

x = continuous independent variable;

z_i = a point of interest in the range of x (a knot);

$\min\{x\} < z_i < \max\{x\}$ for all values of i ;

$z_1 < z_2 < z_3 \dots < z_n$;

$x_i = \{1 \text{ if } x > z_i; 0 \text{ otherwise}\}.$

The $\beta_i(x - z_i)x_i$ terms are interactions (or rotation) terms; the coefficients are slope changes relative to the $i-1$ slope term, or if $i=1$, relative to x . Note: $\beta_i(x - z_i)x_i = \max\{x - z_i, 0\}$.

The x_i terms are jump (or discontinuity) terms; the coefficients are y -intercept changes relative to the $i-1$ intercept term, or if $i=1$, relative to β_0 .

The figure below illustrates the effects of including each type of term in the model.

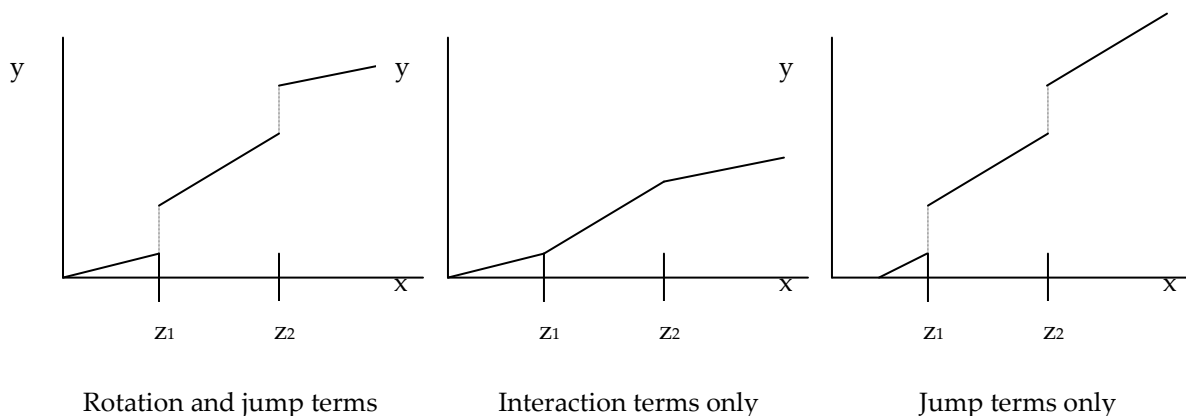


Figure E-1. Piecewise Linear Regression Models

Regression Results: Spline - Interaction (slope) Terms Only

ln(population) x population size category

Dependent Variable:

Natural Log of Number of Promotional Interest Groups, *lnm4*

Linear regression (OLS)

West, w, is the omitted region; less than 50,000 is omitted pop. size.

Regression with robust standard errors

Number of clusters (state)=50

Number of obs=3087

F(13, 49) =936.83

Prob>F=0.0000

Rsquared=0.8541

Root MSE=0.45839

Mean Variance Inflation Factor=4.35

	Coef.	Robust Std.Err.	t	P>t	[95% Conf. Interval]	
<i>lnb2pop01</i>	0.4427	0.03189	13.88	0.000	0.379	0.507
<i>lnb2s04</i>	0.0168	0.00399	4.21	0.000	0.009	0.025
<i>lnb2s05</i>	0.0078	0.00302	2.58	0.013	0.002	0.014
<i>lnb2s06</i>	0.0085	0.00355	2.39	0.021	0.001	0.016
<i>lnb2s07</i>	0.0054	0.00538	1.01	0.316	-0.005	0.016
<i>lnb2s08</i>	0.0177	0.00602	2.94	0.005	0.006	0.030
<i>lnb2s09</i>	-0.0093	0.00472	-1.97	0.054	-0.019	0.000
<i>lnb2s10</i>	0.0000	0.00312	-0.01	0.991	-0.006	0.006
<i>lreldiv</i>	0.4451	0.06600	6.74	0.000	0.313	0.578
<i>lnumgouv</i>	0.1905	0.05884	3.24	0.002	0.072	0.309
<i>lherf</i>	-0.2101	0.04891	-4.30	0.000	-0.308	-0.112
<i>cons</i>	-3.8711	0.20266	-19.10	0.000	-4.278	-3.464

Regression Results: Spline - Intercept (jumps) Adjustments Only

population size category

Dependent Variable:

Natural Log of Number of Promotional Interest Groups, *lnn4*

Linear regression (OLS)

West, w , is the omitted region; less than 50,000 is omitted size category.

Regression with robust standard errors

Number of clusters (state)=50

Number of obs=3087

F(13, 49)=900.29

Prob>F=0.0000

R-squared=0.8540

Root MSE=0.45855

Mean Variance Inflation Factor=3.73

Variable	Coef.	Robust Std.Err.	t	P>t	[95% Conf. Interval]	
<i>lnb2pop01</i>	0.4456	0.03173	14.04	0.000	0.382	0.509
<i>psz10</i>	0.0215	0.03900	0.55	0.585	-0.057	0.100
<i>psz09</i>	-0.0562	0.05766	-0.97	0.335	-0.172	0.060
<i>psz08</i>	0.2161	0.06497	3.33	0.002	0.086	0.347
<i>psz07</i>	0.0848	0.05930	1.43	0.159	-0.034	0.204
<i>psz06</i>	0.1360	0.03966	3.43	0.001	0.056	0.216
<i>psz05</i>	0.1070	0.03348	3.20	0.002	0.040	0.174
<i>psz04</i>	0.1548	0.03706	4.18	0.000	0.080	0.229
<i>lrldiv</i>	0.4445	0.06588	6.75	0.000	0.312	0.577
<i>lnumgovs</i>	0.1904	0.05884	3.24	0.002	0.072	0.309
<i>lherf</i>	-0.2107	0.04907	-4.29	0.000	-0.309	-0.112
<i>cons</i>	-3.8977	0.20072	-19.42	0.000	-4.301	-3.494

Appendix F

Part Two: Regression Results

Dependent Variable:

Number of Promotional Interest Groups Per Capita, *n4pc*

Original, Full Model

Linear regression (OLS)

West is the omitted region; less than 50,000 is omitted size category.

Regression with robust standard errors

Number of clusters (state)=47

Number of obs=1234

R-squared=0.6179

Root MSE=0.00019

	Coef.	Robust Std.Err.	t	P>t	[95% Conf. Interval]	
<i>opopdensity</i>	5.22E-04	1.27E-04	4.12	0.00	2.67E-04	7.77E-04
<i>wtotexp97pc</i>	1.08E-04	2.26E-05	4.77	0.00	6.22E-05	1.53E-04
<i>decentral2</i>	-2.00E-09	1.18E-07	-0.02	0.99	-2.40E-07	2.36E-07
<i>cntyage</i>	1.78E-07	1.30E-07	1.37	0.18	-8.38E-08	4.39E-07
<i>wincomepc</i>	-3.79E-09	5.73E-09	-0.66	0.51	-1.53E-08	7.74E-09
<i>pseduc</i>	-2.76E-06	2.05E-06	-1.35	0.19	-6.88E-06	1.37E-06
<i>pabovexpov</i>	7.73E-06	2.50E-06	3.09	0.00	2.69E-06	1.28E-05
<i>infantmor</i>	7.86E-07	2.61E-06	0.30	0.76	-4.47E-06	6.04E-06
<i>attyspc</i>	1.84E-02	5.38E-02	0.34	0.73	-8.99E-02	1.27E-01
<i>dentistspc</i>	1.68E-01	8.52E-02	1.97	0.06	-4.06E-03	3.39E-01
<i>doctorspc</i>	-3.45E-02	3.81E-02	-0.91	0.37	-1.11E-01	4.22E-02
<i>pminority</i>	1.30E-06	8.81E-07	1.47	0.15	-4.75E-07	3.07E-06
<i>divd</i>	1.58E-05	4.19E-05	0.38	0.71	-6.86E-05	1.00E-04
<i>votepart</i>	-2.76E-06	1.30E-06	-2.12	0.04	-5.38E-06	-1.35E-07
<i>pcastndr</i>	-7.77E-07	3.45E-06	-0.23	0.82	-7.72E-06	6.16E-06
<i>pclfp</i>	6.89E-05	8.47E-05	0.81	0.42	-1.02E-04	2.39E-04
<i>pover65</i>	2.10E-05	5.51E-06	3.81	0.00	9.93E-06	3.21E-05
<i>punder18</i>	-1.23E-06	3.37E-06	-0.37	0.72	-8.01E-06	5.54E-06
<i>p45to64</i>	-1.49E-06	5.30E-06	-0.28	0.78	-1.22E-05	9.18E-06
<i>crimert</i>	-1.84E-09	4.41E-09	-0.42	0.68	-1.07E-08	7.04E-09

<i>farm97pc</i>	3.94E-03	8.97E-04	4.40	0.00	2.14E-03	5.75E-03
<i>pfarmearn</i>	-3.77E-06	1.81E-06	-2.08	0.04	-7.42E-06	-1.24E-07
<i>majindustries</i>	6.11E-06	3.61E-06	1.69	0.10	-1.16E-06	1.34E-05
<i>prodwpc</i>	-2.37E-05	1.29E-04	-0.18	0.85	-2.83E-04	2.35E-04
<i>n3orgswochpc</i>	6.39E-02	1.75E-02	3.66	0.00	2.87E-02	9.90E-02
<i>reldiv</i>	-3.83E-06	1.31E-06	-2.93	0.01	-6.47E-06	-1.20E-06
<i>chcountrcmspc</i>	-1.47E-02	1.81E-02	-0.81	0.42	-5.11E-02	2.18E-02
<i>percentadh</i>	2.64E-04	9.04E-05	2.92	0.01	8.19E-05	4.46E-04
<i>numgovs</i>	1.01E-06	2.53E-07	3.98	0.00	4.98E-07	1.51E-06
<i>herf</i>	-3.82E-04	6.88E-05	-5.55	0.00	-5.21E-04	-2.44E-04
<i>state_capital</i>	5.05E-05	2.50E-05	2.02	0.05	1.08E-07	1.01E-04
<i>northeast</i>	-5.42E-05	4.15E-05	-1.31	0.20	-1.38E-04	2.93E-05
<i>south</i>	-1.45E-04	4.00E-05	-3.63	0.00	-2.26E-04	-6.47E-05
<i>midwest</i>	4.32E-05	3.23E-05	1.34	0.19	-2.17E-05	1.08E-04
<i>psz04</i>	-1.61E-05	1.64E-05	-0.98	0.33	-4.91E-05	1.68E-05
<i>psz05</i>	-2.62E-05	2.18E-05	-1.20	0.24	-7.01E-05	1.78E-05
<i>psz06</i>	-2.94E-05	3.83E-05	-0.77	0.45	-1.06E-04	4.76E-05
<i>psz07</i>	-1.41E-05	5.86E-05	-0.24	0.81	-1.32E-04	1.04E-04
<i>psz08</i>	-6.98E-05	5.88E-05	-1.19	0.24	-1.88E-04	4.85E-05
<i>psz09</i>	-1.28E-04	9.38E-05	-1.37	0.18	-3.17E-04	6.04E-05
<i>psz10</i>	-1.34E-04	7.97E-05	-1.68	0.10	-2.95E-04	2.62E-05
<i>_cons</i>	-6.46E-04	2.94E-04	-2.20	0.03	-1.24E-03	-5.52E-05

Fractional Logit Robustness Check

Dependent Variable:

Number of Promotional Interest Groups Per Capita, *n4pc*

Original, Full Model, GLM, Fractional Logit Estimate

Deviance = .0573524512

Variance function: $V(u) = u*(1-u/1)$ [Binomial]

Link function: $g(u) = \ln(u/(1-u))$ [Logit]

Optimization method: Maximum Likelihood (ML)

Predicted ymean=0.00052

West is the omitted region; less than 50,000 is omitted size category.

Regression with robust standard errors

Number of clusters (state)=47

Number of obs=1234

Independent Variable	Coef.	Std. Err.	z	P> z	dy/dx	ey/ex
<i>opopdensity</i>	8.82E-01	1.95E-01	4.51	0.00	4.58E-04	0.31
<i>wtotexp97pc</i>	1.84E-01	4.81E-02	3.84	0.00	9.57E-05	0.08
<i>decentral2</i>	3.87E-04	1.87E-04	2.07	0.04	2.01E-07	0.00
<i>cntyage</i>	5.80E-04	2.52E-04	2.30	0.02	3.01E-07	0.10
<i>wincomepc</i>	3.07E-06	1.02E-05	0.30	0.76	1.59E-09	0.04
<i>pseduc</i>	-4.25E-03	3.79E-03	-1.12	0.26	-2.21E-06	-0.06
<i>pabovepov</i>	1.14E-02	4.25E-03	2.69	0.01	5.92E-06	0.98
<i>infantmor</i>	1.22E-03	3.59E-03	0.34	0.73	6.35E-07	0.01
<i>attyspc</i>	1.52E+01	7.70E+01	0.20	0.84	7.87E-03	0.01
<i>dentistspc</i>	1.65E+02	1.16E+02	1.42	0.16	8.55E-02	0.05
<i>doctorspc</i>	-4.69E+01	5.82E+01	-0.81	0.42	-2.43E-02	-0.02
<i>pminority</i>	2.74E-03	1.42E-03	1.92	0.05	1.42E-06	0.05
<i>divd</i>	6.68E-02	6.72E-02	1.00	0.32	3.47E-05	0.03
<i>votepart</i>	-4.56E-03	2.40E-03	-1.90	0.06	-2.37E-06	-0.24
<i>pcastndr</i>	2.35E-03	5.54E-03	0.43	0.67	1.22E-06	0.03
<i>pclfp</i>	1.49E-01	1.41E-01	1.06	0.29	7.71E-05	0.11
<i>pover65</i>	3.39E-02	6.77E-03	5.00	0.00	1.76E-05	0.48
<i>punder18</i>	-9.04E-03	4.87E-03	-1.86	0.06	-4.69E-06	-0.23

<i>p45to64</i>	3.11E-03	7.45E-03	0.42	0.68	1.61E-06	0.07
<i>crimert</i>	-3.25E-06	8.51E-06	-0.38	0.70	-1.68E-09	-0.01
<i>farm97pc</i>	4.49E+00	1.08E+00	4.17	0.00	2.33E-03	0.08
<i>pfarmearn</i>	-6.50E-03	2.73E-03	-2.38	0.02	-3.37E-06	-0.02
<i>majindustries</i>	1.12E-02	5.71E-03	1.97	0.05	5.83E-06	0.26
<i>prodwpc</i>	1.59E-01	2.27E-01	0.70	0.48	8.24E-05	0.01
<i>n3orgswochpc</i>	7.76E+01	2.49E+01	3.12	0.00	4.03E-02	0.15
<i>reldiv</i>	-2.21E-03	2.75E-03	-0.80	0.42	-1.15E-06	-0.05
<i>chcountrcmshpc</i>	3.60E+00	3.44E+01	0.10	0.92	1.87E-03	0.01
<i>percentadh</i>	4.36E-01	1.45E-01	3.01	0.00	2.26E-04	0.22
<i>numgovs</i>	2.07E-03	4.23E-04	4.89	0.00	1.07E-06	0.07
<i>herf</i>	-6.88E-01	1.23E-01	-5.61	0.00	-3.57E-04	-0.22
<i>state_capital*</i>	1.52E-01	3.94E-02	3.87	0.00	8.51E-05	0.16
<i>northeast*</i>	-1.18E-01	7.02E-02	-1.69	0.09	-5.88E-05	-0.11
<i>south*</i>	-3.27E-01	7.33E-02	-4.46	0.00	-1.70E-04	-0.33
<i>midwest*</i>	1.45E-02	4.70E-02	0.31	0.76	7.54E-06	0.01
<i>psz04*</i>	-6.03E-02	2.62E-02	-2.30	0.02	-3.07E-05	-0.06
<i>psz05*</i>	-1.39E-01	4.01E-02	-3.46	0.00	-6.86E-05	-0.13
<i>psz06*</i>	-2.46E-01	7.74E-02	-3.18	0.00	-1.15E-04	-0.22
<i>psz07*</i>	-3.10E-01	1.05E-01	-2.95	0.00	-1.39E-04	-0.27
<i>psz08*</i>	-4.55E-01	1.16E-01	-3.92	0.00	-1.91E-04	-0.37
<i>psz09*</i>	-6.75E-01	1.57E-01	-4.29	0.00	-2.56E-04	-0.49
<i>psz10*</i>	-8.41E-01	1.66E-01	-5.08	0.00	-2.97E-04	-0.57
<i>_cons</i>	-9.61E+00	5.00E-01	-19.21	0.00		
(*) dy/dx is for discrete change of dummy variable from 0 to 1 and ey/ex is the percent change in predicted ymean.						

Part Two: Robustness Check

Comparison of Modified Linear (OLS) Results with Fractional Logit (ML) Results

Criteria for robustness:

1. At 10% significance level, determinations regarding the null hypotheses agree for both calculations.
2. If both marginal significance levels are less than or equal to 0.10, the signs on the elasticities must agree for both calculations.
3. The two elasticities must be of the same order of magnitude generally. When both calculations are displayed in scientific notation, the exponents must not differ by more than 1.

Independent Variable	OLS ey/ex	FL ey/ex	OLS $P> z $	FL $P> z $	Robust at 10% s.l.	Robust at 5% s.l.
<i>opopdensity</i>	0.32	0.31	0.00	0.00	x	x
<i>wtotexp97pc</i>	0.09	0.08	0.00	0.00	x	x
<i>decentral2</i>	0.00	0.00	0.99	0.04		
<i>cntyage</i>	0.05	0.10	0.18	0.02		
<i>wincomepc</i>	-0.09	0.04	0.51	0.76	x	x
<i>pseduc</i>	-0.07	-0.06	0.19	0.26	x	x
<i>pabovexpov</i>	1.17	0.98	0.00	0.01	x	x
<i>infantmor</i>	0.01	0.01	0.76	0.73	x	x
<i>attyspc</i>	0.01	0.01	0.73	0.84	x	x
<i>dentistspc</i>	0.09	0.05	0.06	0.16		x
<i>doctorspc</i>	-0.03	-0.02	0.37	0.42	x	x
<i>pminority</i>	0.04	0.05	0.15	0.05		
<i>divd</i>	0.01	0.03	0.71	0.32	x	x
<i>votepart</i>	-0.25	-0.24	0.04	0.06	x	
<i>pcastndr</i>	-0.02	0.03	0.82	0.67	x	x
<i>pclfp</i>	0.09	0.11	0.42	0.29	x	x
<i>pover65</i>	0.52	0.48	0.00	0.00	x	x
<i>punder18</i>	-0.06	-0.23	0.72	0.06		x
<i>p45to64</i>	-0.06	0.07	0.78	0.68	x	x
<i>crimert</i>	-0.01	-0.01	0.68	0.70	x	x

<i>farm97pc</i>	0.13	0.08	0.00	0.00	x	x
<i>pfarmearn</i>	-0.03	-0.02	0.04	0.02	x	x
<i>majindustries</i>	0.25	0.26	0.10	0.05	x	
<i>prodwpc</i>	0.00	0.01	0.85	0.48	x	x
<i>n3orgswochpc</i>	0.21	0.15	0.00	0.00	x	x
<i>reldiv</i>	-0.16	-0.05	0.01	0.42		
<i>chcountrcmshpc</i>	-0.04	0.01	0.42	0.92	x	x
<i>percentadh</i>	0.24	0.22	0.01	0.00	x	x
<i>numgovs</i>	0.06	0.07	0.00	0.00	x	x
<i>herf</i>	-0.21	-0.22	0.00	0.00	x	x
<i>state_capital*</i>	0.09	0.16	0.05	0.00	x	x
<i>northeast*</i>	-0.10	-0.11	0.20	0.09		x
<i>south*</i>	-0.26	-0.33	0.00	0.00	x	x
<i>midwest*</i>	0.08	0.01	0.19	0.76	x	x
<i>psz04*</i>	-0.03	-0.06	0.33	0.02		
<i>psz05*</i>	-0.05	-0.13	0.24	0.00		
<i>psz06*</i>	-0.05	-0.22	0.45	0.00		
<i>psz07*</i>	-0.02	-0.27	0.81	0.00		
<i>psz08*</i>	-0.12	-0.37	0.24	0.00		
<i>psz09*</i>	-0.23	-0.49	0.18	0.00		
<i>psz10*</i>	-0.24	-0.57	0.10	0.00		
(*) dy/dx is for discrete change of dummy variable from 0 to 1 and ey/ex is the percent change in predicted y mean.						

Appendix G

Part Two: Stability Test Detail

Likelihood Ratio Test of Null Hypothesis those coefficients in A = those coefficients in B:

Number of obs = N = 1234;

A RSS = 0.000015875;

B RSS = 0.000027507;

POOLED RSS = 0.000045217;

(A RSS + B RSS) 0.000043382;

POOLED RSS/(A RSS + B RSS) = 1.042298649;

$\ln(\text{POOLED RSS}/(\text{A RSS} + \text{B RSS})) = 0.041428514$;

$N * \ln(\text{POOLED RSS}/(\text{A RSS} + \text{B RSS})) = \chi^2 = 51.12$.

CRIT χ^2 at 5% significance level and 41 degrees of freedom = 57.

p= 0.13; null hypothesis NOT REJECTED at 5% significance level.

Note: RSS=Residual Sum of Squares

Appendix H

Part Two: Linear-Linear Model (for reference only)

Dependent Variable:

Number of Interest Groups Per Capita, *n4pc*

Original, Full Model in Linear-Linear Form

Linear Regression (OLS)

West is the omitted region; less than 50,000 is the omitted size category.

Robust Std. Errors with clustering by state

Number of state clusters=47

Number of observations=1234

R-squared=0.63

AdjR-squared=0.61

MSE=0.00019

Mean variance inflation factor=3.06

Variable	Coef.	Robust Std.Err.	t	P> t	[95% Conf. Interval]	
<i>popdensity</i>	-1.54E-08	1.47E-08	-1.04	0.30	-4.50E-08	1.43E-08
<i>totexp97pc</i>	6.22E-05	1.38E-05	4.52	0.00	3.45E-05	8.99E-05
<i>decentral2</i>	2.65E-08	1.17E-07	0.23	0.82	-2.09E-07	2.62E-07
<i>cntyage</i>	1.34E-07	1.29E-07	1.04	0.30	-1.25E-07	3.94E-07
<i>incomepc</i>	-3.56E-09	3.32E-09	-1.07	0.29	-1.02E-08	3.13E-09
<i>pseduc</i>	-2.24E-06	2.09E-06	-1.07	0.29	-6.45E-06	1.97E-06
<i>pabovepov</i>	6.62E-06	2.50E-06	2.65	0.01	1.59E-06	1.16E-05
<i>infantmor</i>	9.83E-07	2.63E-06	0.37	0.71	-4.31E-06	6.27E-06
<i>attyspc</i>	2.50E-02	5.50E-02	0.45	0.65	-8.57E-02	1.36E-01
<i>dentistspc</i>	1.45E-01	8.33E-02	1.74	0.09	-2.27E-02	3.13E-01
<i>doctorspc</i>	-3.99E-02	3.79E-02	-1.05	0.30	-1.16E-01	3.65E-02
<i>pmminority</i>	1.40E-06	9.10E-07	1.53	0.13	-4.35E-07	3.23E-06
<i>divd</i>	1.25E-05	4.35E-05	0.29	0.78	-7.51E-05	1.00E-04

Part Two: Linear-Linear Model (for reference only) (Continued)

<i>votepart</i>	-2.14E-06	1.26E-06	-1.70	0.10	-4.67E-06	3.92E-07
<i>pcastndr</i>	-1.05E-07	3.41E-06	-0.03	0.98	-6.96E-06	6.75E-06
<i>tfarm97pc</i>	0.00411	0.00088	4.70	0.00	0.00235	0.00587
<i>tpfarmearn</i>	0.00000	0.00000	-1.70	0.10	-0.00001	0.00000
<i>tmajindustries</i>	0.00000	0.00000	1.69	0.10	0.00000	0.00000
<i>tprodwpc</i>	0.00008	0.00013	0.58	0.57	-0.00019	0.00034
<i>tn3orgswochpc</i>	0.00016	0.00003	6.20	0.00	0.00011	0.00021
<i>treldiv</i>	0.00000	0.00000	-4.84	0.00	0.00000	0.00000
<i>tchcountrcm spc</i>	0.00000	0.00000	-0.41	0.69	0.00000	0.00000
<i>tpercentadh</i>	0.00018	0.00008	2.38	0.02	0.00003	0.00033
<i>tnumgovs</i>	0.00000	0.00000	4.04	0.00	0.00000	0.00000
<i>state_capital</i>	0.00005	0.00002	2.27	0.03	0.00001	0.00010
<i>therf</i>	-0.00027	0.00006	-4.52	0.00	-0.00038	-0.00015
<i>n</i>	-0.00002	0.00005	-0.48	0.63	-0.00013	0.00008
<i>s</i>	-0.00011	0.00004	-2.71	0.01	-0.00020	-0.00003
<i>m</i>	0.00008	0.00003	2.58	0.01	0.00002	0.00014
<i>psz04</i>	-0.00002	0.00002	-1.03	0.31	-0.00005	0.00002
<i>psz05</i>	-0.00002	0.00002	-1.18	0.25	-0.00006	0.00002
<i>psz06</i>	0.00000	0.00003	-0.09	0.93	-0.00007	0.00006
<i>psz07</i>	0.00004	0.00005	0.66	0.51	-0.00007	0.00014
<i>psz08</i>	0.00003	0.00006	0.42	0.68	-0.00009	0.00014
<i>psz09</i>	-0.00003	0.00007	-0.36	0.72	-0.00018	0.00012
<i>psz10</i>	0.00004	0.00008	0.50	0.62	-0.00012	0.00020
<i>cons</i>	0.00162	0.00030	5.48	0.00	0.00103	0.00222